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How I Lived on 3d. a Day

And what I Learnt from it
With Chapters on the A.B.C. of Cheap and
Good Foods their cost and comparative value, by
F. J. CROSS :: :: :: ::

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How I Lived on Threepence a
Day and what I learnt from it :
with Chapters on the A.B.C. of
Cheap and Good Foods, their
Cost and Comparative Value.

By

F. J. CROSS,

Author of "Character and Empire-Building," &c.

With a FOREWORD by

ROBERT HUTCHISON, M.D. Edin., F.R.C.P.

AND

EIGHT CHARTS.

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FOREWORD.

There are few subjects on which popular instruction is more urgently needed than on the relative value of foods. Much of the malnutrition and chronic ill-health, which are unfortunately so rife amongst the poorer classes of the community, are due, not so much to inability to buy the necessaries of life, as to ignorance of what it is best to buy. In this little book the author has set out, very simply and plainly the science of food values, and has shown in a way which anyone can understand, how such scientific knowledge can be applied to marketing. No housewife can read what he has to say without great benefit and without being able to reduce her weekly expenditure in food. It is to be hoped, therefore, that the book may be widely read, and that it will serve to spread information and to stimulate thought on this most practical matter.

ROBERT HUTCHISON.

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PREFACE.

CAN a man live on threepence a day and not suffer in health and efficiency ?

Food experts tell us that he can if he is not engaged in hard manual labour, and it appears an appropriate question to raise now that the increasing cost of living is making the lot of the very poor additionally hard and difficult.

At such a time it would seem desirable that every man and woman should have some general knowledge of the nutritive value and comparative cost of the different kinds of food.

Especially is this knowledge desirable for those to whom economy is necessary, and to those who have to pass through a period of stress and strain owing to unemployment or other causes.

In this work I have stated a few elementary facts as to the cost and relative value of foods in a manner that I trust may be easily understood.

The early chapters contain a record of my views in regard to living on three pence a day and what happened when I tried the experiment.

My experiences are of course quite unimportant from a scientific point of view. Anyone can live on as little, or less, for a time, without difficulty : those who do so will learn much in the process.

But the record may be of some value by showing how large a saving can be effected in expenditure by the purchase of such foods as give the highest nutritive value at the smallest cost. And if this helps

those who are obliged for a season to endure hardship the work may serve a useful purpose.

The later chapters deal with different aspects of the question of food and give information which I hope may be of general interest.

In preparing this work I have been greatly indebted to the important work on Food and Dietetics by Dr. Robert Hutchison, to the writings of Dr. Langworthy, Prof. Atwater and other American experts, and to the works of Mr. Eustace Miles, Dr. Haig, Mr. Albert Broadbent, Mr. Alan Murray, Mr. Seebohm Rowntree and others.

To the United States Department of Agriculture I owe cordial thanks for permission to reproduce some of the valuable Food Charts prepared under the direction of the Office of Experiment Stations ; and I also desire to acknowledge my indebtedness to the York Health and Housing Reform Association for permission to reproduce Charts and information which they have prepared.

I have also to thank Dr. Hutchison, Dr. Langworthy, Mr. Seebohm Rowntree, and Mr. Alan Murray for their kind examination of the proofs of my book. This does not, of course, imply that they take any responsibility for my statements or calculations. But it is an evidence of the genuine interest which both British and American experts take in the most humble attempts to throw light on this important subject.

How I Lived on Threepence a Day.

CHAPTER I.

THE THEORY OF LIVING ON THREEPENCE A DAY.

Does any one really need to live on so small a sum as threepence a day? Many people doubt it, but it is nevertheless a fact that a large number of persons are obliged to do so in every-day life.

A Member of Parliament (Mr. Philip Snowden), recently declared in the House of Commons that in the City of Bradford there were many working-class families whose income was only sufficient to allow $1\frac{1}{2}$ d. a day per head for food.

WE may be quite sure that the statement which applies to Bradford is true of all our great cities, and it is therefore no idle plan to try to show how men and women may live to the best advantage on threepence a day.

Let us suppose that a man and woman under stress of circumstances have for a time to live in the most economical manner possible. The man perhaps has been unemployed for weeks and unable to get work, and the woman can only get an occasional job of charring. Their savings are nearly gone, they fear to get behind with the rent and they want to spend only what is necessary to keep body and mind working properly. Or, it may be, an elderly ill-paid clerk loses his place and either not having been able to save or having neglected to do so (never having thought of the possibility of his being

turned off in his old age) sees himself face to face with a very unpleasant situation.

The questions which then become important are :—

1. What amount of food is actually necessary to keep a man and woman in good health ;
2. What kinds of food give the greatest nourishment at the smallest cost.
3. How can the most agreeable dishes from such food be made, so as to get the greatest variety ?

It may be an unpleasant time to go through, but many a good man and worthy woman have had to face such a state of things. I won't complicate matters by imagining there is a little family to consider though that happens often enough in real life.

As the man would, from the nature of the case, be doing but very little in the way of labour, he would not require as much food as a person in full work. But in my table of diet I have made provision for nearly the average amount of food consumed by working-men, according to the statistics printed in a later chapter.

As such an amount of food is somewhere near what scientific men of various countries tell us is necessary for the proper support of the body, this seems to be proceeding on the right lines. I have provided for the woman four-fifths of the amount of food the man consumes, which is what experts consider a fair comparative allowance. The woman will possibly during this exceptional period be doing as much work as the man, and it is not an over-generous provision, but probably more than she receives on the average when people are in want. For a woman as a rule shows wonderful self-denial in such cases and will pinch "ever so" in order that her man may have enough.

I am assuming they want to live on threepence a day each ; that is to say that the actual cost of their food must not be more than 3s. 6d. a week for the two.

Now men of science tell us that we can get sufficient food to keep the body in good condition for this sum, if the people are not doing hard work.

I shall not bother about scientific calculations in this chapter or explain how the amount of nutriment necessary is known. That can follow later. Nor am I going to speak of exceptional instances I have known, such as the case of two men who existed on $4\frac{1}{2}$ d. for a week, or of men who have partially or completely fasted for days. I shall provide for three meals a day which is as much as any man or woman really wants.

THE PRICE OF FOOD.

The price of food not only varies from year to year but also in different districts, but I have taken the price at which I have bought it in a south-east district of London, assuming that it can be purchased at a similar rate in any of the large towns, which are the places where the pinch of poverty is most widely felt.

We have then three shillings and sixpence to spend on food and this is how I suggest it can best be expended :—

	s.	d.
Bread—seven 2-lb. loaves at $2\frac{1}{2}$ d.	1	$5\frac{1}{2}$
Oatmeal or Rolled Oats, 2 lbs.	0	3
Lentils or Peas, 1 lb.	0	2
Haricot Beans, 1 lb.	0	$1\frac{1}{2}$
Rice, 1 lb.	0	$1\frac{1}{2}$
Dates, 1 lb.	0	$1\frac{1}{2}$
Dripping and Margarine, $\frac{3}{4}$ lb. at 5d. lb.	0	$3\frac{3}{4}$
Macaroni, $\frac{1}{2}$ lb.	0	$1\frac{1}{4}$
Cheese, Dutch or American, $\frac{1}{4}$ lb.	0	$1\frac{3}{4}$
Skim-milk, $1\frac{1}{2}$ quarts	0	3
(Or better 2 quarts or more of butter-milk)		
Sundries—Pepper, Salt, etc.	0	$0\frac{3}{4}$
Bones for Soup	0	1
	<hr/>	
	3	$2\frac{1}{2}$
	<hr/>	

This will give us practically all we require for keeping the body in an efficient condition, and we have a balance of $3\frac{1}{2}$ d. for comforts which will help to make our meals

more pleasant. I should recommend Household or Standard Bread by preference. Skim milk might be got at $1\frac{1}{2}$ d. a quart, and lentils or peas at $1\frac{1}{2}$ d. per lb.

We may expend the balance of $3\frac{1}{2}$ d. on tea, sugar, potatoes, &c. We need not now be bound to what is strictly the best food for body-building or energy giving.

A woman would probably insist on having tea even if she had to go short of other things which are essential. But she can have this little luxury with a quiet mind.

It will be remembered that when Robert Peary went to the North Pole he carried tea as part of his stores over the frozen seas, looking upon it as practically a necessity, and so long as it is not stewed and made poisonous (or taken to excess as it often is) it will prove a pleasant stimulant to the imagination and help to put us on good terms with ourselves.

The following method of expending our surplus is suggested :—

	s.	d.
Sugar, $\frac{1}{2}$ lb. (or more Dripping for cooking) ...	0	$1\frac{1}{4}$
Potatoes, $2\frac{1}{2}$ lb.	0	1
Tea, 1 oz. at 1/- a lb.	0	$0\frac{3}{4}$
Pot-herbs	0	$0\frac{1}{2}$
	<hr/>	
	0	$3\frac{1}{2}$

With this amount of food for the week let us see what kind of a bill of fare we could make. Bread being our “staff of life,” we must get it in as many forms as possible so as to make an agreeable variety.

MONDAY.

BREAKFAST—Porridge, Milk, Tea, Bread, Margarine.

DINNER—Pea or Lentil-soup, Bread-steak, Toast.

SUPPER—Baked Potatoes, Tendersides, Dripping and Bread.

TUESDAY.

BREAKFAST—Porridge, Milk, Tea, Bread, Dripping.

DINNER—Macaroni, Toast and Margarine, Dates.

SUPPER—Bread and Cheese, Tea.

WEDNESDAY.

BREAKFAST—Porridge and Milk, Tea, Toast.

DINNER—Haricot Beans, Rice and Milk.

SUPPER—Boiled Potatoes, Bread-steak.

THURSDAY.

BREAKFAST—Porridge, Milk, Tea, Bread, Dripping.

DINNER—Macaroni, Toast and Margarine.

SUPPER—Bread and Cheese, Tea.

FRIDAY.

BREAKFAST—Porridge and Milk, Tea, Toast.

DINNER—Lentil-soup, Bread, Dates.

SUPPER—Toast, Bread and Dripping.

SATURDAY.

BREAKFAST—Porridge and Milk, Tea, Tendersides.

DINNER—Haricot Beans, Toast and Margarine.

SUPPER—Baked Potatoes, Bread and Dripping.

SUNDAY.

BREAKFAST—Porridge and Milk, Tea, Toast and Dripping.

DINNER—Macaroni, Rice-pudding, Bread-steak.

SUPPER—Boiled Potatoes, Bread and cheese.

We must get the greatest possible variety out of our bread food of course, and with forethought a good deal can be done. We can get for instance :

1. Toast.

2. Tendersides or French toast (bread toasted on one side).

3. Bread-pudding.

4. Bread-steak (stale bread moistened with skim-milk and sprinkled with pepper and salt and fried till brown).

Then we must make the most of our potatoes, arranging for :

1. Potatoes roasted in skins.

2. Potatoes boiled in skins.

3. Potatoes fried.

Naturally, too, our lentils and haricots must be boiled or stewed, and made up in the most palatable form.

For this purpose a Spanish onion would be an advantage to give them a pleasant flavour. But in our straitened circumstances this must be regarded as a luxury, for if we step far beyond the bounds of necessities we should have to reduce our bread bill and this would be unwise. So we fall back on toast as an appetiser with our soup. It must always be borne in mind we are not out for enjoyment during such a week.

The tea will, of course, be weak, but it will be none the worse for that if it is hot. As a variation the hot drink which some poor people brewed years ago when tea was expensive might be tried, viz. : boiling water poured on burnt toast—really hot toast-water. There are ten average teaspoonfuls in one ounce of tea, more or less according to the size of the spoon. That will give a spoonful each time tea is mentioned in our budget with two spoonfuls on Sunday morning, and this I have found to be ample. Personally I should use less and have it of better quality if I drank tea at all.

No doubt the dripping or margarine must be used with such care that it will only give “bread and scrape,” and the slices of cheese must be cut thin.

But many families—even among the middle classes, have had to “screw” a good deal in times of adversity, and if not too prolonged it is no great misfortune to face such a period—it may prove a benefit.

This is theory of course, and theories don't always work out on all fours with actual practice. For instance when a London County Council teacher was showing the children a suitable meal for a family of four, one of her class remarked, “That's all very well, teacher, but *my* father would eat the lot at a go.”

Let us show what happens every day in the greatest and richest city in the world.

There are, alas ! quite a number of respectable, hard-working people who have to get along on even less than Mr. Philip Snowden indicates.

Mrs. Pember Reeves, who has devoted much time to visiting the poor in the south of London, mentions

cases where, after providing sufficient food for the man, as wage-earner, the wife and children have to exist on **nine-pence a week each for food** : not for a short time but for an unlimited period.

Now, no knowledge of food-values can enable a family to secure physical efficiency on such a sum. A radical upheaval of social conditions is necessary to meet such cases. The idea of providing new milk for the children at 4d. or 5d. a quart is out of the question. But, though little good can result to people so situated from anything said here, a statement of the facts may tend to stir the public conscience to action.

Here are some budgets of such families with a few particulars of their general social condition which Mrs. Reeves has supplied me.

“Mr. A., a printer’s labourer, wages vary from 23/- to 24/- a week ; steady man in full work, needs 1/6 a week for fares to and from work, allows wife about 21/- a week, 6 children born, 6 alive, all tuberculous.

“The general expenses of the family average about 13/6 a week, thus :

				s.	d.
Rent—3 small rooms	...	...	...	8	0
Burial Insurance	...	...	...	1	8
(a funeral costs from 30/- upwards, according to size of child).					
Coal Club	...	...	...	1	0
Boot Club	...	...	...	1	0
Clothing Club	...	...	...	0	6
Gas	...	...	...	0	9
Soaps, soda and blue	...	...	...	0	5
2 reels of cotton	...	...	...	0	1½
Tape	...	...	...	0	0½
				13	6

“This leaves for a week’s food for 8 persons the sum of 7/6. The bread-winner needs more spent on him because his working efficiency must be kept up. To

take $4\frac{1}{2}$ d. a day for the father's food would mean that $\frac{2}{8}$ a week was spent on him : not an exorbitant amount for a man in full work. That leaves the sum of $\frac{4}{10}$ to be spent on 7 persons, or an average per head of $8\frac{1}{2}$ d. for a week's food. Mrs. A. lays out her $\frac{7}{4}$ in the following manner :—

14 loaves	...	...	...	...	2	11
Meat	...	...	...	...	1	10
Suet	...	...	...	...	0	3
1 quartern Flour	...	...	...	...	0	5
4 ozs. Tea	...	...	...	...	0	4
2 tins Milk	...	...	...	...	0	7

(This milk has been separated before being tinned and has in red letters on outside of tin : "not recommended as food for infants.")

12 lbs. potatoes	...	...	...	...	0	6
Vegetables	...	...	...	...	0	6

7 4

"Mr. B., emergency 'bus-conductor, at 4/- a day, generally had four days' work a week, with an occasional fifth. His usual income was 16/- a week. He gave every penny he made to his wife. When he occasionally brought her 20/- she used to save in order to have something by her for the 16/- weeks. There were 5 children born and 5 alive, all tuberculous.

					s.	d.
Rent, 3 rooms in dark basement	...				7	6
Burial Insurance	...	...	...		0	7
Soap $1\frac{1}{2}$ d., soda $\frac{1}{2}$ d.	...	...	...		0	2
Gas	...	...	...	...	1	0

(Month of August :—no coal. Cooking done by gas).

9 3

"This leaves $\frac{6}{9}$ for a week's food for 7 persons. Take $\frac{2}{6}$ a week for bread-winner and $\frac{4}{3}$ is left for

the food of 6 persons or $8\frac{1}{2}$ d. a week for each person :—

					s.	d.
10 loaves	...	...	...	...	2	1
$\frac{1}{2}$ quartern Flour	...	...	...	...	0	$2\frac{1}{2}$
12 lbs. potatoes	...	...	...	...	0	4
Cabbage	...	...	...	...	0	2
Meat	1	6
2 lbs. Jam	0	6
4 ozs. Tea	0	$3\frac{1}{2}$
2 lbs. Sugar	0	$4\frac{1}{2}$
1 tin Milk	0	$3\frac{1}{2}$
1 lb. Butter	1	0
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“Later on this man fell out of work owing to his company being absorbed in a motor-'bus company. He being an emergency man had to go. He was a steady man. Out of work for many months he did odd jobs which brought in varying sums from $2/6$ to $7/6$ a week. His boy of 12 earned $2/7$ by delivering milk, and his eldest girl became old enough to leave school and earn 5/- in a sweet-factory. The united earnings came to 10/1 some weeks and 15/1 others. The weeks when the father earned little the children and woman sometimes had an average of

$4\frac{3}{4}$ d. or $5\frac{1}{4}$ d. PER HEAD FOR A WEEK'S FOOD.

“That man has now got work again at 20/- a week I am glad to say, so his children are getting the usual 9d. a week for food.”

Some light is thrown on Mr. Snowden's statement, quoted at the beginning of this chapter, in a very interesting Report issued by the City of Bradford Education Committee (1907—1910). In this it is stated that children from 966 families were supplied with free dinners. In these families were 5,182 members, somewhat over five on an average in each household.

The total amount available for expenditure when rent had been deducted was $1/9\frac{3}{4}$ on an average for each person, whether man, woman or child, or about 3d. a day.

But this amount could not of course be spent on food alone as the cost of boots and clothing, insurance, gas, coal, and other things had to be provided from it.

Free dinners were given to the children of these families under the direction of the Education Committee—excellent, substantial meals which cost $1\frac{1}{2}$ d. each meal for food alone (exclusive of service) or at the rate of 9d. to 10d. a week. This is about the total sum that Mrs. Pember Reeves found was available for the cost of food per week for each person except the bread winner, and corresponds with Mr. Snowden's statement.

So that whether we consider London in the light of Mrs. Pember Reeves' figures, or provincial cities in the light of the Bradford report, we find that there is a considerable percentage of the population which has to exist year in, year out, on food costing far less than threepence a day. And in the light of this fact it would seem that were it not for the free dinners supplied by the municipal authorities the chances of our country possessing a strong healthy population in the future would be very remote.

CHAPTER II.

THE SCIENCE OF LIVING ON THREEPENCE A DAY.

In the last chapter I have kept out of sight the science of the subject and merely stated facts.

The doctor, when he has questioned his patient writes a prescription or sends a bottle of medicine but does not try to explain what is in the dose or why he gives it. Years of study have helped him to make up the stuff in the bottle of medicine, or write the prescription, which may give renewed health. But the patient would not understand if the doctor tried to explain the whole of the science involved in the pleasant—or unpleasant—mixture which he has to take.

In the same way as I am stating a few things I have learnt from the reading of various books on food and from personal experience and telling these in language which I trust all can understand I shall not try to explain all at once the steps by which doctors and food-experts have found out the values of different kinds of diet. That will come later on.

But so that the reader may understand that what I have written in the preceding chapter is based on science I will make a few general statements on the subject.

Scientific men have agreed that a man requires daily somewhere about 1,200 to 1,800 grains of protein to keep the body in repair, and 2,500 to 4,000 calories of energy to give him power to do the day's work properly, whilst a woman requires about four-fifths of this amount.

Let me just say in regard to the two words I use :—

1. That PROTEIN is the name given to the nitrogenous substance which builds up and renews the body

and helps to form bone and muscle, flesh and tissue, blood and brain.

2. That CALORIE is a term used to denote a certain amount of energy or heat (just as we say a "pound" of sugar).

and then I shall leave further explanation till I deal more in detail with the subject later.

Everybody knows in a general way that there is waste going on daily in the body and that whenever we move our arms, or legs, chop a piece of wood, wash clothes, walk a yard, turn the handle of a door, sweep the floor, dust the mantelpiece, lift a weight, write a letter, or do any kind of work whatever that requires muscular exertion a certain amount of force is expended. To obtain the energy we require we must have heat, to get heat we take food. Actually we make up a kind of fire in the body every day by the food we eat, just as a fire is made in the grate or in a steam engine. That is roughly the science of the subject in a nutshell.

Different foods give different results, each kind of food provides a greater or less amount of nourishment. In the chapter on "The Theory of Living on Threepence a Day" I have not chosen my foods haphazard. Some of the foods selected are not those which working-men or the poorer classes in this country generally eat. Yet the principal food from which the greater part of our nourishment is derived in the suggestions I have made, namely bread, is largely used in every household.

What I have done is to select a variety of foods which give high nutritive value though low in price. The nourishment derived from these foods may not equal what the ordinary working-man gets from the diet his wife gives him, because it is much less in quantity. The food selected may not be so pleasant, or varied, or "tasty" as that which he usually has. But when it is put into the body it produces an amount of nourishment not far short of what the average man is accustomed to have; in any case it gives him sufficient for health if he is not doing much work.

Here is a little table showing how the necessary body-building and heat and energy-producing material is derived from the food which can be purchased for threepence a day.

Remember we have to produce at least 1,200 grains protein and 2,500 calories energy daily for the man, also about 1,000 grains protein and 2,000 calories energy daily for the woman.

We don't want to starve the body and injure it so we will provide 1,500 grains protein daily for the man, and 1,200 for the woman, or daily for the two, 2,700 grains protein and 4,500 calories energy. During the week we have to produce seven times that amount or 18,900 grains protein and 31,500 calories energy.

Let us see how it can be done.

I repeat the articles of diet mentioned in the previous chapter, giving their food value in the terms of science.

	Grains of Protein	Calories of Energy.
Bread—seven 2 lb. loaves will produce	10,080	17,530
Oatmeal, 2 lb. ,, ,,	2,320	3,712
Lentils (or Peas), 1 lb. ,, ,,	1,800	1,600
Haricot Beans, 1 lb. ,, ,,	1,520	1,680
Rice, 1 lb. ,, ,,	580	1,600
Dates, 1 lb. ,, ,,	144	1,600
Margarine or Dripping, $\frac{3}{4}$ lb. ,,		2,643
Macaroni, $\frac{1}{2}$ lb. ,, ,,	360	820
Cheese, $\frac{1}{4}$ lb. ,, ,,	672	360
Skim milk, 1 $\frac{1}{2}$ quarts ,, ,,	800	660
Total	18,276	32,205

Thus we can provide for actual requirements and a little in the way of luxury for the sum mentioned, viz., 3s. 6d., for the two persons, and we may fairly say that we have in theory made two ends meet. There is, indeed, a surplus of energy shown, but we must recollect that a small portion of the food we eat is not digested in passing through the body. By purchasing bread and beans at the price I actually paid we could

more than make up the slight deficiency in protein and largely increase the amount of energy.

As to meat in any form we must do without it, for meat, price for price, provides far less nourishment than vegetable foods, such as wheat, oats, peas, and beans furnish. The bones for soup mentioned in my account in Chapter I. will be useful, but we have not needed to include them in our table to make up the required quantity of protein and calories.

Very cheap scraps of fish or meat might be bought, but the diet I have outlined is, on the whole, far better.

We must not have whims and fancies when we have to live on threepence a day. 'Tis a case of "Hobson's Choice." Hobson, the Cambridge livery-stable keeper, kept forty horses, and gave every customer his choice of a steed, the only condition being that he had to take the horse that stood nearest the stable-door! So with us we must take what will yield the best results.

But if we really can keep in health and good spirits whilst feeding at the rate of threepence a day that is a fact of some interest.

CHAPTER III.

HOW I LIVED ON THREEPENCE A DAY AND
HAD A SURPLUS.

After theory and science—PRACTICE. Having worked out my scheme I put it in operation for a week.

It was one of the most instructive weeks I ever spent. It was also one of the pleasantest.

This is a list of my food for the seven days, and the cost of each item :—

						s.	d.
(a)	2 loaves of white bread at $2\frac{1}{4}$ d.	...	...	...	...	0	$4\frac{1}{2}$
(b)	1 loaf of "Standard" bread	...	...	...	...	0	$2\frac{1}{2}$
(c)	1 lb. oatmeal	...	...	...	...	0	2
(d)	1 lb. Haricot Beans	...	...	...	...	0	$1\frac{1}{2}$
(e)	1 pint Milk	...	...	...	...	0	2
(f)	1 lb. Dates	...	...	...	...	0	2
(g)	1 lb. Rice	...	...	...	...	0	$1\frac{1}{4}$
(h)	2 ozs. Dripping	...	...	...	...	0	$0\frac{3}{4}$
(i)	5 ozs. Margarine at 5d. per lb.	...	...	...	...	0	$1\frac{1}{2}$
(j)	$\frac{1}{2}$ lb. Potatoes	...	...	...	...	0	$0\frac{1}{2}$
(k)	$\frac{1}{2}$ lb. Sugar	...	...	...	...	0	$0\frac{3}{4}$
(l)	Tea, $\frac{1}{4}$ ounce	...	...	...	...	0	$0\frac{1}{4}$
(m)	Sundries, Pepper and Salt, say	...	...	...	...	0	$0\frac{1}{2}$
Total						1	8

I give below, approximately, the nutritive value of these articles. Estimates by different experts naturally vary. My figures in this chapter are based mainly on Mr. Broadbent's standards set forth in the chart called

WHAT ONE PENNY BUYS.

EXPLANATORY NOTES.

This Chart shows how the amount of protein and energy which is required for keeping the body in good health can be procured most cheaply.

The double lines indicate the number of grains of protein and the thick black lines the calories of energy furnished by food which can be bought for one penny.

Thus a pennyworth of oatmeal gives 580 grains of protein and 926 calories of energy, a pennyworth of flour 590 grains of protein and 1000 calories of energy, and a pennyworth of peas 860 grains of protein and 860 calories of energy.

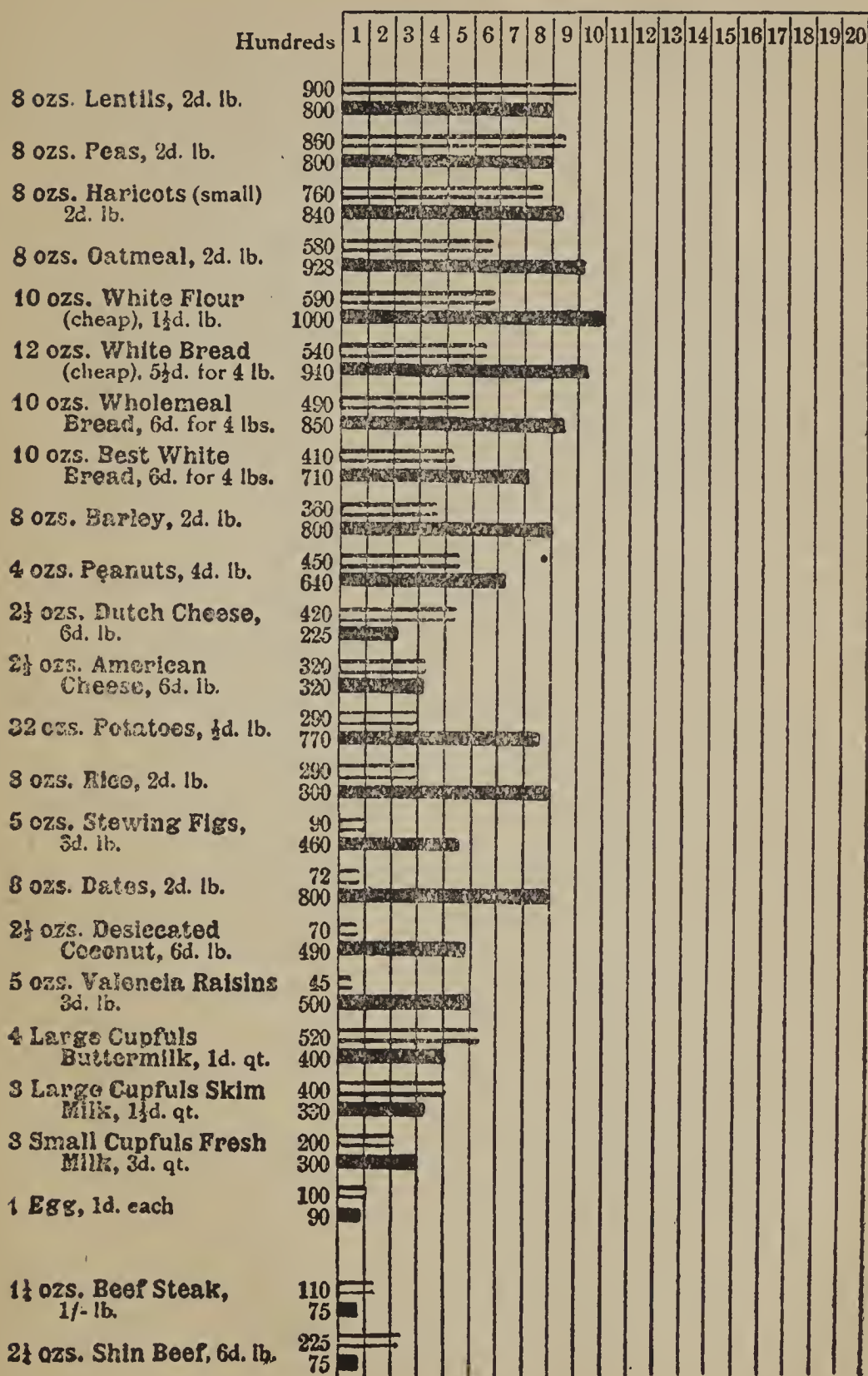
WHAT ONE PENNY BUYS, which are taken from those of Prof. Atwater, one of the greatest of food experts :—

				Protein Grains.		Calories of Energy.
6 lbs. Bread	...	...	...	4320	...	7520
1 lb. Oatmeal	...	...	...	1160	...	1856
1 lb. Haricot Beans	...	...	...	1520	...	1680
1 pint Milk	...	...	...	266	...	400
1 lb. Dates	...	...	...	144	...	1600
1 lb. Rice	...	...	...	580	...	1600
2 ozs. Dripping and	}	...	...		...	1542
5 ozs. Margarine						
$\frac{1}{2}$ lb. Potatoes	...	...	...	72	...	192
$\frac{1}{2}$ lb. Sugar	...	...	...		...	882
Tea						
Sundries, Pepper, Salt...		...	...		...
				8,062		17,272

As I was not engaged in manual labour the food I have mentioned was sufficient from a scientific point

WHAT ONE PENNY BUYS

==== Indicates Protein;— ■■■■■ Energy



Reproduced from a Chart in Colours by Albert Broadbent F.S.S. F.R.H.S.

of view to keep body and mind in good order for the time. Moreover, if I had spent my surplus of one penny on beans, omitted potatoes, used skim milk instead of new milk and spent the sum so gained on oatmeal rice, or otherwise it would have given me about—

1500 grains more of Protein and
2200 more calories of Energy.

I could have still further increased the scientific value of my food had I known at the beginning, instead of the end, of the week of experiment that I could get oatmeal at 1½d. a lb. and dripping, &c. at a smaller price than I actually paid.

From inquiries I have made among those who are obliged to live in the cheapest possible way I have reason to believe I could have done so had I bought at such shops as the poorer classes frequent. Remember that many of the cheapest forms of food are as nutritious as the more expensive. A pound of Stilton costs 1s. 4d., but practically the same amount of nutriment can be had in Dutch or American cheese for half that price, whilst a pennyworth of dripping or margarine is of equal value nutritively to four pennyworth of best butter.

My menus were not, of course, as varied as they would have been had I been providing for two or more persons. The time at which I partook of the daily fare and my simple courses of food were generally as below :—

BREAKFAST, 8 a.m.—Porridge, with milk and sugar, or salt. Toast and margarine.

LUNCH, 1 p.m.—Haricot beans with pepper and salt, bread, toast, or French toast, dates.

TEA (Saturday and Sunday only)—Tea with toast (or bread), and margarine.

DINNER, 7 p.m.—Rice with sugar and milk, toast or bread, dripping or margarine, dates occasionally.

It looks very uninteresting fare, but in reality I found it the reverse. I introduced a few variations such as :—Preparation of toast soaked in boiling water and

eaten with milk and sugar, or sugar only ; toast and margarine, flavoured with pepper ; and these modifications could have been extended had I felt any necessity for a more varied fare.

I had potatoes only once, and that was once too often, considering the small amount of nutriment they contained compared with their cost at that season—the month of May, when old potatoes were about three farthings a pound, and new potatoes dearer.

I had planned to include cheese, macaroni, and lentils, but found the variety sufficient and therefore did not go further afield in search of other cheap food of high nutritive value to tempt the appetite, such as peas, lentils, figs, raisins, etc.

EXPERIENCES.

I was fairly (but not extravagantly) hungry at each meal, and that gave the zest that is necessary for the enjoyment of food.

Though occasionally I experienced a sensation of emptiness I found that was preferable to the feeling of heaviness and discomfort which sometimes results from a too ample meal. The power of mental work was not lessened—rather the reverse, which is a well known and fully attested experience—and I suffered from no feeling of exhaustion in walking, cycling, and other forms of exertion.

A difficulty I experienced in the earlier days of my experiment was that the use of white bread, without the fruit or vegetables to which I was accustomed, clogged the body and prevented it from doing its work efficiently. On discovering this I tried “Standard” bread. It was pleasanter to the taste than the white bread I had previously purchased ; very palatable both new and stale, and helped to remove the difficulties I have mentioned.

In order to live on threepence a day one has to think, plan, and contrive. A farthing a lb. more or less is a grave consideration, and the endeavour to make two ends meet enables one to realise in a manner otherwise

impossible what the smallest rise in the necessities of life—bread, sugar, milk, etc., mean to the very poor.

I had thought out matters before I started and reckoned that I must not exceed the following prices:—Lentils, peas, haricots and oatmeal, 2d. a lb.; bread, 2½d. the half-quartern loaf, cheese 7d., a lb.; potatoes, 2 lbs. for 1d., rice and dates, 2d. a lb. As will be seen I bought some of these things cheaper than that and when I could not get them at one shop for the rate I had fixed as the maximum I went to another.

In the course of my shopping I came across excellent brawn made of pieces of pork and beef and sold at 4d. a lb. I did not buy any because vegetable foods are far cheaper than animal foods. But where two shillings to half-a-crown a week could be spent on food, cheap fish, and brawn, and the cheaper cuts of meat might advantageously be used for those who are averse to a vegetarian diet.

Let me conclude by stating briefly

WHY I LIVED ON THREEPENCE A DAY.

1. Because I found such great and lamentable ignorance among the poor and all classes about the nutritive value of different kinds of food.

2. Because I was assured by an expert I could live on 2d. a day.

3. Because I believed it quite possible to live for a time in comfort on 3d. a day.

4. Because I have known of people who, when out of work, and unable to afford a full meal have fallen back on beer to stimulate them instead of bread to strengthen them.

5. Because I thought it would enable me the better to call attention to this want of knowledge.

6. Because many working people think more of getting an extra shilling a week in wages than of saving double that amount by using the best and cheapest kinds of food.

7. Because many poor people have a terrible struggle for existence and to know about food values may mean

the difference between misery and comfort—hunger and sufficiency.

8. Because I hope that people may talk to one another about this simple experiment and that it may make them think.

9. Because the fact that a person has got to live on 3d. a day tends to make him very thrifty, careful, thoughtful, and foreseeing.

10. Because it was a pleasant experiment: though I hope the time is coming when no man or woman will need to live on 3d. a day.

11. Because a little hard living is good for everybody.

12. Because men who have fought for the Empire have often done on far less.

13. Because it is a healthy thing even for rich people to fast or live sparingly at times and to think these things out for themselves so as to prevent waste.

14. Because oceans of care are caused by unnecessary anxiety as to “filling the pot,” which would not occur if people were content to live more simply.

The food I took is not equal to prison or workhouse diet. But I contend that what I had is sufficient for a working man during a time of stress, and if it wasn't, God help those families which live in London, Bradford, and elsewhere, whose income is “only sufficient to allow 1½d. a day per head for food!”

CHAPTER IV.

HOW I LIVED ON 3d. A DAY.

BUYING STORES.

I am going to mention a few experiences of my week's experiment. I do not attach any special value to them beyond the fact that they made me see things in a different light. When I set off, bag in hand, to do my shopping, I felt I must try to buy the best things in the very cheapest market.

My first call was at the greengrocer's. I wanted to get potatoes at a halfpenny a pound and had noticed a place where they were on sale at that price. But the shopkeeper—honest man—could not recommend those potatoes! The best were 3d. for 4 lbs., and those at 2½d. for 4 lbs. did not look of good quality. The nutritive value of potatoes did not warrant me paying more than a halfpenny a lb. so I went away without buying any. I was supplied with ½ a lb. that day at home, (or what remained of ½ a lb. after extensive peeling), which will be found in my week's bill. But being unable to get really good ones at my fixed price I cut them out of my menu thereafter.

Then I went to a corn-chandler's shop and inquired the price of oatmeal. "2½d. a lb.," said the man, "for the best Scotch."

"Have you nothing cheaper?" said I.

"Well, I have 'Grits,'" said he, "at 1½d. but that is used for chickens."

2½d. was beyond my scale so (as I wasn't buying for

chickens) we did no business. I went on my way, and after inspecting several shop windows, bought it at 2d. a lb.

PEAS AND DATES.

I went into a shop to ask about peas, and was told the price was high, just then $2\frac{1}{2}$ d. a lb. That seemed too much so I decided to keep to haricot beans and oatmeal.

The price of dates was a blow to me. I went to a shop where only a fortnight previously I had seen them ticketed at $1\frac{1}{2}$ d. a lb. But there was nothing that day less than 2d. a lb. Asking the reason why, the shopkeeper informed me that early in the year dates are at their cheapest and that a few weeks before he had been able to buy at a low price. But now the price had risen. There seemed no chance of buying off barrows at 2 lbs. a 1d. as some of my little friends who live "near the bone" had done. Besides I did not fancy barrow stuff that could not be washed so I had to pay 2d. and be content.

REAL VALUE.

I soon came to a shop which greatly interested me.

Oatmeal was ticketed at $1\frac{1}{2}$ d. per lb.; Rice at $1\frac{1}{4}$ d. per lb.; Sugar at $1\frac{1}{2}$ d. per lb.; Haricot Beans at $1\frac{1}{2}$ d. per lb.

Here I became a regular "Jubilee plunger" and bought a pound of each. I was particularly pleased about the rice for one pound gives

580 grains protein.

1600 calories energy.

whilst 2 lbs. potatoes costing 1d. would only supply

290 grains protein

770 calories energy.

I had rather a disappointment at the baker's. After all I had heard of the merits of Standard bread I hoped I should have been able to buy at the same price as the ordinary loaf. But no! when I asked at the shop

I was told that Standard bread would cost me $2\frac{1}{2}$ d. a loaf, instead of $2\frac{1}{4}$ d. for white.

That seemed curious, as our regular baker was charging a farthing less for Standard bread whilst here I found it a $\frac{1}{4}$ d. more! However, the bread at $2\frac{1}{4}$ d. looked excellent, and proved so. I bought a loaf and received a big extra chunk for make-weight.

MARGARINE.

Fat of some kind was necessary. It does not build up the body but it supplies energy in a cheap and palatable form. I noticed that I could get $1\frac{1}{2}$ lbs. net of a famous brand of margarine for 9d. (1 lb. "over-weight") but as I discovered I could save a $\frac{1}{4}$ d. by buying a $\frac{1}{4}$ lb. at 5d. a lb. a little further on in the street I did so, for farthings had to be reckoned with.

I asked the shopman if the margarine which he sells at 5d. a lb. was for cooking or eating. He replied, "just as you like." He thought a good deal was used for cooking but that the poor no doubt ate it.

I asked him if *he* ate it and a genial smile puckered his face as he answered obliquely "It's quite pure."

Well if it is pure and the taste is all right what does one want more? When there was a discussion as to whether this article should be pronounced margarine or marjarine (hard g or soft) someone remarked, "Why not call it butter?" Once in the body it comes to the same thing as butter: 'tis fat and there's an end of it. I felt of course the disadvantage of my position, first in having to provide for one person instead of several and next in not being able—like the thrifty housewife—to go around and deal at the barrows.

CHAPTER V.

HOW I LIVED ON 3d. A DAY.

THE EXPERIMENT IN OPERATION.

I had a cup of hot water at 7.15 a.m. in place of the usual cup of tea.

“It is far better,” said I to myself as I took the first sip of water with a wry face. “Far, far better,” I murmured, as I finished it, “no poison in that, no tannin.”

At 8 o'clock I went down to breakfast at the sound of the gong. There was a delicious odour of fried bacon rising from the kitchen. The sight of the daintily-prepared rashers and the white-bosomed eggs done to a turn nearly unnerved me.

My eye rested on the delicate butter in a way it had not hitherto, the golden marmalade looked uncommonly attractive. I eyed them with a secret longing as I glanced at the plate before me. Those dainties were not for me this week anyhow. I had never quite realised before how good is a full breakfast of anything you like.

But I settled to my task with a kind of superior pride rising within me as I surveyed my companions. Then one asked:—

“Is it worth it?”

“Not for myself,” I answered, “though I think I'm going to have some new experiences that will be

interesting. But when I remember the other fellow—yes.”

That completed the argument. I was allowed to proceed unmolested. Really mine was a very good meal if eaten with a thankful heart. The others settled to their varied fare taking it carelessly as though it was just a matter of course. They went on the go-as-you-please principle of eating what you like till you feel you have had enough.

I partook of my economical and scientific breakfast. It consisted of porridge with a little milk, toasted bread, bread and dates, hot water flavoured with milk.

DISCOMFORTS.

I had a little headache at 11 o'clock. It did not come from last night's dinner for certain as I was all right at breakfast, and it was quite a simple dinner in its way. Here is the menu:—

Hors d'Œuvre de Choix.

Consommé aux Perles.
Crème Princesse.

Saumon d'Ecosse. Sauce Hollandaise.
Salade de Concombres.

Ris de Veau aux Petits Pois Nouveaux.
Selle d'Agneau. Sauce Menthe.
Haricots Verts au Beurre.
Pommes Nouvelles.

Poularde Rotie en Casserole.
Salade de Romaine.

Jambon d'York, braisé au Madère.

Charlotte de Pommes.

Bomb aux Fraises,
Petits Fours.

Dessert.

Café.

But I had a troubled morning. "Brother Ass" (as Francis of Assisi called the Body) having enjoyed such a dinner last night did not relish now being put on a short commons all at once so no wonder there were ructions. At 12 o'clock having gone out into the garden and done some grass cutting, my headache was better. But I found the stomach a very troublesome companion. He was grumbling already though not a twentieth part of our week of experiment had gone by and suggested all kinds of things to my lower nature. "Bother science" he said in effect, "do as the others do, why bother about the bottom dog; it won't do anyone the least good. I want a pick-me-up now, a glass of milk or an egg beaten up, or a good slice of bread and butter."

"But my dear stomach," my higher nature answers, "Science says you are having sufficient."

"I am hungry," he whines.

"Only imaginary I assure you; does not Eustace Miles go fasting till mid-day and you have had a good square meal already."

"Everyone to his taste," he responds churlishly. "I feel faint and hungry, I want food."

He is so persistent, so unreasonable. Although he must have stores laid up which would last for a week with nothing but water he yelps for more!

But my headache lessened and the feeling of emptiness passed as work proceeded. It is always the first step that costs.

GOING BETTER.

For lunch I had a most enjoyable meal. Two ozs. of haricot beans boiled for three hours and eaten with a little pepper and salt, made a delicious first course.

Bread and dripping followed. Allowing for the latter at the rate of 6d. a lb. seemed rather extravagant compared with 5d. a lb. for margarine but I must have variety and I had not then learnt that dripping could be got more cheaply.

My headache quite vanished in the first few minutes of lunch, and the stomach being quite satisfied no longer kept up its wail. The fact is the body had received nutriment equal to what I had paid 5/- for the previous night. Though I had eaten no meat I had received a similar amount of protein and energy from the vegetable

COMPOSITION OF FOOD MATERIALS : MEAT.

EXPLANATORY NOTES.

This Chart gives examples of the nutritive values of various kinds of meat.

It will be observed that meat is generally inferior in Protein (body-building material) to beans, peas, and lentils, weight for weight, though it costs three to six times as much per lb. Thus the following is about the percentage of protein contained in the foods mentioned :—Lamb Chops 18, Pork Chops 17, Smoked Ham 16, Beef Steak 19, Beans 22, Peas 24, Lentils 25, Oatmeal 16, Flour 14. In regard to energy value Meat is inferior, weight for weight, to cheap vegetable foods though it costs so much more as may be seen from the following table, giving the fuel or energy value per lb. of various foods :

Lamb Chops	1540	Beans	... 1605
Pork Chops	1580	Peas	... 1655
Smoked Ham	1940	Lentils	... 1620
Beef Steak	1130	Oatmeal	... 1860
Dried Beef	840	Flour	... 1675

food I had consumed. As I ate my simple meal it occurred to me that at last I was leading the simple life.

But, casting my eyes on the daintily spread table, the snowy cloth and the gleaming silver upon it, I remembered the rough crusts eaten from the stone bench with no cover or napkin, no knife or trencher, no shining plate, no servant to wait, which satisfied the "poor

U.S. Department of Agriculture
Office of Experiment Stations
A.C. True: Director

Prepared by
C.F. LANGWORTHY
Expert in Charge of Nutrition Investigations

COMPOSITION OF FOOD MATERIALS.



Protein



Fat



Carbohydrates



Ash



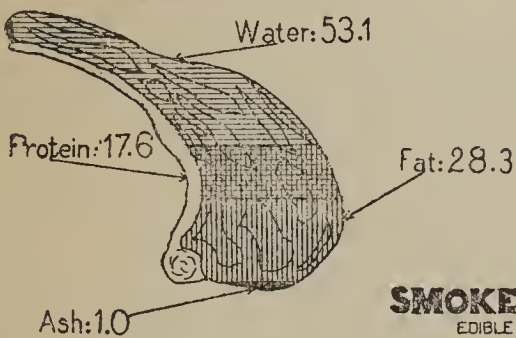
Water



Fuel Value
1 Sq. In. Equals
1000 Calories

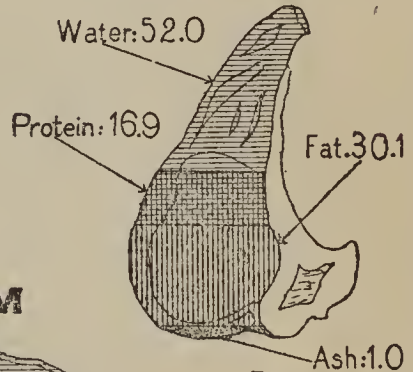
LAMB CHOP

EDIBLE PORTION



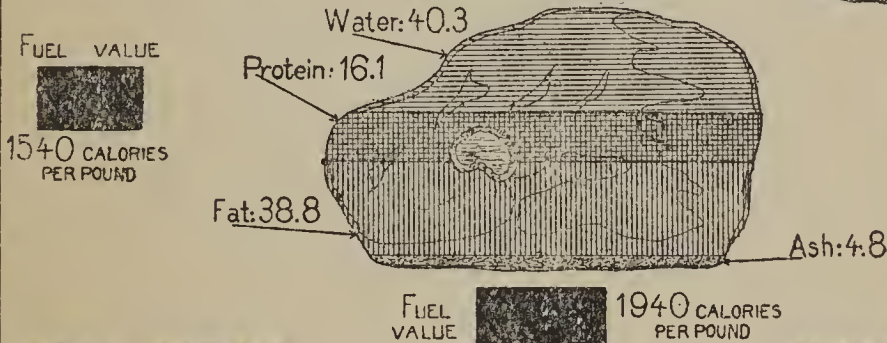
PORK CHOP

EDIBLE PORTION



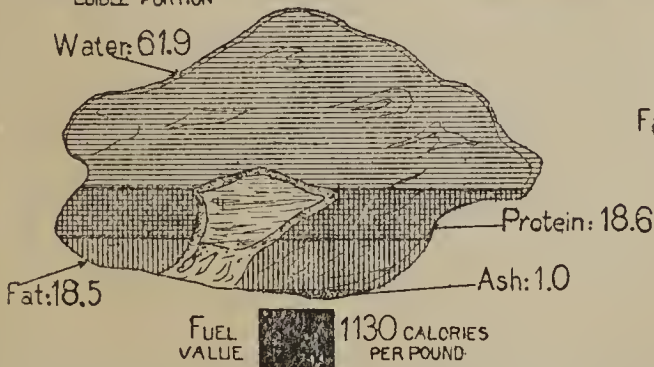
SMOKED HAM

EDIBLE PORTION



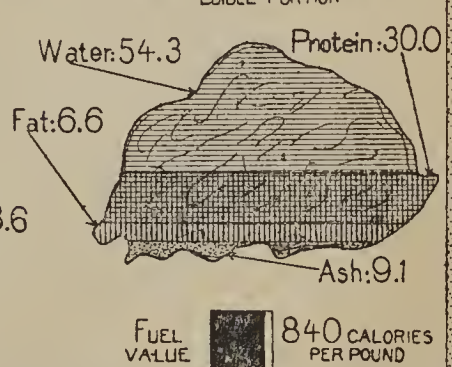
BEEF STEAK

EDIBLE PORTION



DRIED BEEF

EDIBLE PORTION



VARIOUS KINDS OF MEAT.

Small reproduction of a Chart issued by the U.S. Department of Agriculture

brother of Assisi" and filled him with holy joy. Then I perceived I was only on the outskirts of the simple life after all. So I finished my meal with a humble mind.

THE QUESTION OF TEA.

The afternoon passed happily. The question I debated was whether I should have a cup of tea. I was rather drawn towards it. Custom had made the quite unnecessary habit of 4 o'clock tea almost a necessity to me.

Having argued the thing out I came to the conclusion I must pass this agreeable interlude for a few days to see how things worked out. Luxury must wait upon moderation for once in a while.

I didn't like it the first day, but reason overcame imagination; I was busy and forgot I wanted it.

I went on pleasantly till 7 o'clock dinner. This consisted of rice and sugar (I should have preferred a little more milk!) $\frac{1}{2}$ lb. potatoes, pepper and salt, toast and tendersides with dripping, and dates. I had an appetite which needed no stimulating. And it was fairly and squarely satisfied. I enjoyed the meal as much as I should have done one of the usual kind. At least that was the impression left on my mind. So the First Day ended quite satisfactorily.

CHAPTER VI.

HOW I LIVED ON 3d. A DAY.

EXPERIENCES AND REFLECTIONS.

I was up at 6 a.m. next day having slept the deep, dreamless undisturbed sleep which seems the herald of health. "The sleep of a labouring man is sweet whether he eats little or much ; but the abundance of the rich will not suffer him to sleep " is a truth one is apt to overlook.

My early hot water (in place of tea) was to-day quite agreeable.

I fancied I had a suspicion of taste in the mouth which comes from a too abundant meal overnight, but some hard work in the garden removed this and gave me a fine appetite for my breakfast.

Two ozs. of oatmeal, in the form of porridge, eaten with a little milk and a pinch of salt made a pleasant first course, and this was followed by toast and dripping ; my morning beverage being hot water agreeably flavoured by milk.

It was curious to notice that by the second day I had lost much of my desire for the varied dishes on the table. My meal could not have been more agreeable if it had consisted of many courses. And the fragrant tea produced no responsive desire in my mind. Habit and

imagination count for so much in life! Till yesterday I had had—

A small cup of tea at 7.15 a.m.

2 large breakfast cups at breakfast.

A small cup at 11 a.m.

A small cup after lunch.

2 small cups at 4.30 p.m.

And a small cup in the evening at 9 o'clock.

I always took care to have it fresh and weak so I don't suppose it did me any harm. But the strange thing was that the desire had so soon passed away. Hot water neat, or flavoured with milk, I found to suit me quite well.

THE JOY OF LIVING.

The morning passed pleasantly. No longer was "Brother Ass" bothering for more. My spirits were quite "on top" and remained so till the end of the experiment. Never have I felt greater pleasure in life or fitter for work or enjoyment.

I planted out some sweet peas, transplanted some sunflowers, cut a privet hedge and in addition did my usual work indoors.

My lunch consisted of : 1st course—Haricot beans flavoured with pepper and salt, 2nd course—toasted bread with margarine, with toast-water. A King might have envied me the pleasure of that simple meal. I had believed I should loathe margarine yet I found it quite as agreeable as butter! Indeed it was an improvement on butter in some ways. I did not need so much of it and the flavour kept uniform.

What surprised me on this and subsequent days was the freedom from oppression, and the buoyancy of the imagination: the machine ran freely, it was not clogged in any way.

I was able to understand what I had learned from other men who have tried simple living, viz.: the new *joy of living* they have experienced as a result of light and suitable diet; and to comprehend a Franciscan Father who told me that his 140 days of fasting during the year

were, he considered, beneficial even to his physical health.

MORE GRUMBLES.

The stomach has not quite given over his discontent but he argues now without humpiness : " What you're doing," he said to-day, " is not fair or reasonable."

" And why ? " I inquire.

" Well, for years past you've eaten meat and pudding, soup, fish, cheese, and vegetables, and now you've knocked them all off at once and put me on worse than prison or workhouse diet."

" That's quite true, I reply," " but you have plenty of ' the staff of life,' and if you can keep my mind fresh and elastic this new form of diet must be good for us both. Besides you have plenty of fat laid up for a lean day, and in addition remember we are fighting for a principle ; and for the sake of others."

" All right, but I want some green food, or anyway, a change of bread."

Greens certainly won't come in on 3d. a day but as a result of careful consideration I started " Standard " bread.

One day I worked pretty hard in the garden for more than two hours before dinner and was fiercely hungry. My meal that night consisted of boiled rice with milk and sugar, toast, and margarine, toast soaked in boiling water and eaten with sugar. There seemed a big lot of rice on my plate and I made inquiries to ascertain that I was not " over-running the constable " but was told there was plenty of rice to finish the week. As this had only cost me $1\frac{1}{4}$ d. a lb. I could sleep without fear of starvation. I should have liked some milk with my soaked toast or " sop," but having been a little extravagant there was none left, so I had to go without. That would not have occurred if I could have bought skim or separated milk conveniently. But it is sold only at very few shops in the neighbourhood where I live.

On the fifth day of my experiment, like a thrifty

housewife, I made up my accounts and examined my stores. I found I was doing very well and could indulge a little, so decided I might launch out into the quite unnecessary luxury of tea for the next two days and arranged accordingly. Also I could see I would probably save a bit. I was therefore on quite good terms with myself and reflected that many quarrels would be prevented if the housewife were methodical and thrifty, and the husband reasonable and self-denying.

THE QUESTION OF SAVING.

To-day the stomach, which had been quiet and satisfied though losing a little weight, began again :

“ I’d like a real good breakfast to-morrow being Sunday. You can afford it you know. Give me a good fat bloater, it’ll only cost a penny.”

I considered and then replied, “ Oh unregenerate ass, you don’t really want it and we’ll finish this week well as we began it.”

“ Now that’s unreasonable,” he grumbles, “ to want to *save* on 3d. a day.”

“ It’s always well to have a safety margin,” I reply.

“ I agree,” says he, “ but I haven’t had any margin this week.”

“ Suggest something else,” I say.

“ A nice bit of cheese, or a welsh rarebit.”

“ That’s better and cheese is quite a useful article of diet. Still we can do very well without.”

“ Well, a halfpennorth of jam wouldn’t come amiss.”

“ Jam is so dear from a pecuniary point, and in our circumstances it seems absurd to buy it.”

“ Well an apple then.”

“ Apples are expensive just now.”

“ Just a bit of watercress would be a nice little change.”

“ That’s a very good suggestion but the nutritive value of watercress, though it has its uses, is next to nil.”

“ Well,” he grumbles, “ what do *you* suggest ? ”

“Just to go on as we are. We are doing all right, and we shall have a surplus which will be very good.”

“I’m not so sure. Some folks pinch and screw and save money and put it into bags and store it up and live in a beastly dirty state and then die of starvation. What’s the good of their money to them in that case?”

“Quite true, meanness is as bad as extravagance. But we’re out on self-sacrifice this week. Imagine we’re out of work.”

“You can’t expect a stomach to have much imagination,” he replies, and all I can imagine is that I would like a real good varied meal.”

Thus the argument between mind and matter finished, and I added tea (costing a farthing) to the luxuries.

When the experiment ended I had one penny to spare. Owing to the rise in the price of food I should have spent up to the hilt if I had had the same provisions in the autumn as in the spring though my experience would have taught me to get as much protein and energy for less.

REFLECTIONS.

“Familiarity breeds contempt,” and by the end of the week there seemed no reason why I should not have gone on indefinitely. I did not eat largely when I began the old life again. The food I ate did not give me much more protein and energy than I had had during that week, anyway I lost weight during the next two weeks rather than gained it and lost a little more yet during the next two months.

This experiment though it has been of no scientific value, has opened my eyes a good deal as to what people might do to add to the purchasing power of their wages.

Talking to a police sergeant at this time he pointed out that it was public-houses in crowded and slum neighbourhoods which were the most successful. Just the people who can least afford it spend so much in drink, that great “palaces” with flaming lights and

handsome fittings occupy the best situations and flourish more than any other trade.

The street-barrow men are often relegated to the side streets where thrifty souls with string bags make good bargains for Sunday fare, but the "Red Lion," and "The Crown" have no need to economise ; the money pours in over their counters.

So 'tis no good concentrating all our strength in getting rid of low wages and unemployment, though that is exceedingly important. We ought side by side to show people how to make the most of what they already have. We must co-operate to help each other as the Irish farmers have been taught to do by their admirable organisation, and in such ways endeavour to raise the standard of living.

As Mr. Horace Fletcher wisely remarks :

"The great art in life now is not to know best how to earn a mere sustenance, but to learn the art of most profitable spending."

CHAPTER VII.

FIRST STEPS IN KNOWLEDGE.

Let me in this chapter try to explain in a very simple manner a little of the science of food and some of the terms used in regard to it.

Food has a double duty to perform : first, it has to repair the waste that goes on in the material of which the body is made ; secondly, it has to furnish the body with strength and vigour for its daily work. Food is transformed in the body in a wonderful manner, into body-building material and into heat and energy.

The chemical substances of which our bodies are composed are very similar to the food we eat. Water is found in abundance, both in foods and in the body. About two-thirds of the weight of the body is made up of water which forms a part of all the tissues. Hence, though a man may abstain from foods altogether for many days, he is obliged to drink water during that period.

It seems rather a strange fact that man is made of water and solids somewhat in the same proportion as the space occupied by water compares with the land area of the earth, but so it is.

First in importance of the substances contained in food comes Protein (or Proteid). The word is derived from the Greek *protos*—first—and is applied to the body-building material found in most foods, in lean meat and in the white of egg, in wheat, oatmeal and peas ; in rice, cheese, and milk, and many other animal and vegetable substances. About one-fifth of the weight of the body is made up of protein, which enters

into the composition of bone, muscle, and tissue. The protein, or albumin, derived from the albuminous substances in the food we eat renews tissue and bone, blood, brain and muscle (besides supplying some energy,) so that protein-foods are essential to life and health.

Protein is rich in nitrogen compounds. Nitrogen forms about four-fifths of the atmosphere and is found in all living things. If we could extract all the nitrogen from the atmosphere direct for use as food we should not need to grow wheat at all. As the result of recent researches nitrogen is now actually extracted from the air by electricity in such a form that it can be employed as an aid to the production of farm-crops, and is put into the soil like manure in order to nourish those foods which sustain our lives.

HOW ENERGY IS SUPPLIED.

Whilst the body needs to be built up and kept in repair it also needs to be supplied with warmth and energy. This is furnished to some extent by the same foods as provide the protein.

Fats, such as are found in butter, oil, and margarine etc., in meat and fish, and in bread, vegetables, fruit, nuts, cocoa, etc., supply the heat and energy necessary to enable us to work. When people take more food than the body wants for daily use, some of the surplus forms fat. Persons are so differently constituted, however, that the formation of fat does not always depend on the amount of food eaten.

In addition to protein and fats the food we eat also contains carbohydrates and mineral-matter, which furnish energy and help in building the body. Carbohydrate is a term applied to compounds containing carbon, hydrogen, and oxygen in certain proportions. Sugar is a most useful form of food because it is pure carbohydrate and assists in supplying energy which is required for the body to do its work efficiently. Potatoes contain a great deal of starch, which is another

form of carbohydrate and are a pleasant food for the people.

It will thus be seen that our food contains amongst its properties the elements that make up the air—oxygen and nitrogen—in addition to mineral substances. Dried peas and beans, bread, oatmeal and macaroni, contain a large amount of carbohydrate and are rich also in protein.

The mineral-matter furnished by food is required for the bones and teeth mainly, and, though it supplies no energy is necessary for the body.

The value attached to minerals is shown in every-day life by the use of lime-water for children and of iron and other tonics for grown-up people. Green vegetables such as cabbage are useful on account of the mineral salts they contain.

IMPORTANCE OF KNOWLEDGE.

To know the A.B.C. of the nutritive value of different kinds of food and to act on that knowledge is just as important in its way as it is to know the alphabet or to have good wages. To have an elementary knowledge of what are the best and cheapest foodstuffs is most desirable for all working-men and women and essential to those of small means, if they are to be properly nourished.

To clerks who marry early this knowledge may mean the difference between spending all these earnings and laying by a few shillings weekly to ensure freedom from anxiety at a time of illness or emergency.

A PENN'ORTH OF BEANS OR A STEAK.

It is almost incredible how great a saving may be effected by a thorough knowledge of the value of various kinds of food. It may seem strange to many, but it is substantially true, that there is more nourishment in threepennyworth of haricot beans, oatmeal or bread, than there is in a shillingworth of beef steak, and incomparably more than in five-shillingworth of beer,

whilst the body derives far more benefit from a penny-worth of peas, beans or lentils than from a chop or steak.

Now is that really true ?

Well, let us compare a half lb. mutton chop costing 5d., and a half lb. rump steak costing 6d., with a half

COMPOSITION OF FOOD MATERIALS : BREAD.

EXPLANATORY NOTES.

The valuable qualities of bread, its richness in protein and carbohydrates, its high fuel value, and the fact that it contains in addition fat and ash are clearly set forth in the diagrams. All the elements that go to build the body and give it warmth and energy are shown to be abundant in "the staff of life." It will be seen that macaroni though quite a pleasant and useful food cannot be compared with bread in nutritive value.

"Corn" bread is made from Indian corn meal.

lb. of beans or peas costing 1d. In every hundred parts of each of these articles there is :

	Refuse.	Water.	Protein.	Fat.	Ash.	Carbo	Calories of Energy.
Beans ...	—	12.6	22.5	1.8	3.5	59.6	802
Peas ...	—	9.5	24.6	1.0	2.9	62.0	827
Chop ...	16.0	42.0	13.0	28.3	0.7	—	723
Steak ...	20.7	45.0	13.4	20.2	0.7	—	555

That statement means, put in simple language that we get nearly double the body-building material and far more energy for one penny (for three-farthings in fact if we buy beans or peas at 1½d. per lb.) than we do from a chop or a steak which costs 5d. or 6d. The only material in which the chop or steak is superior to the beans or peas is in refuse and water !

But if there is such a vast difference between the

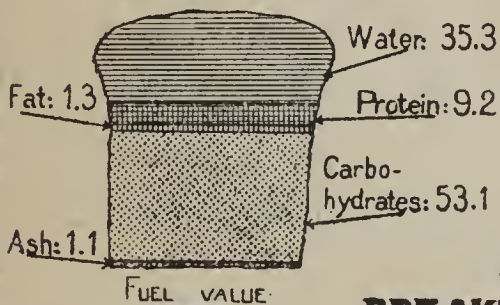
U.S. Department of Agriculture
Office of Experiment Stations
A.C. True: Director

Prepared by
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Expert in Charge of Nutrition Investigations

COMPOSITION OF FOOD MATERIALS.



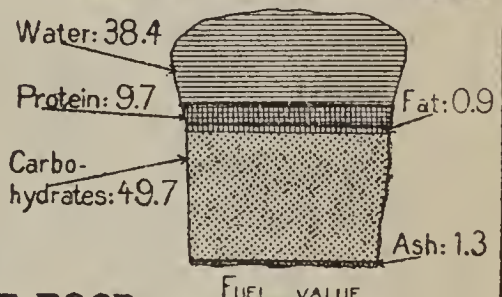
WHITE BREAD



FUEL VALUE

1215 CALORIES
PER POUND

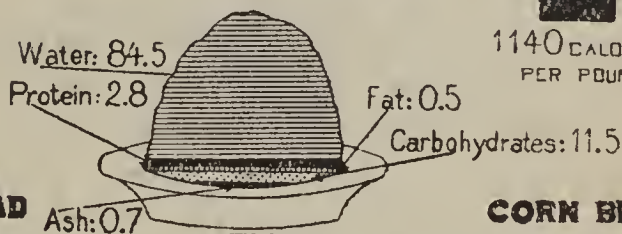
WHOLE WHEAT BREAD



FUEL VALUE

1140 CALORIES
PER POUND

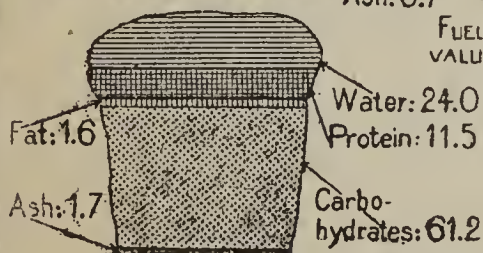
OAT BREAKFAST FOOD COOKED



FUEL VALUE

285 CALORIES
PER POUND

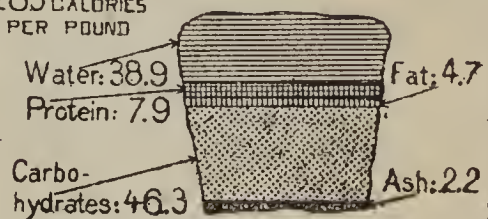
TOASTED BREAD



FUEL VALUE

1420 CALORIES
PER POUND

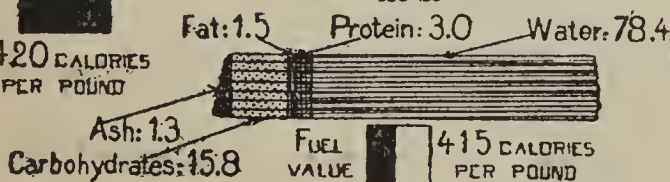
CORN BREAD



FUEL VALUE

1205 CALORIES
PER POUND

MACARONI COOKED



FUEL VALUE

415 CALORIES
PER POUND

CEREAL FOODS.

Small reproduction of a Chart issued by the U.S. Department of Agriculture.

cost and actual value to the body of different kinds of foods mentioned, why do men and women who need to study economy eat meat at all? Many people don't whether they are rich or poor. Others eat meat because they think it an agreeable and concentrated form in which to take nourishment and better than living on a diet of bread-stuffs and vegetables. A vegetarian diet is bulky compared with flesh-foods, unless eggs, cheese, &c., be included.

Those to whom cost is no consideration and to whom meat does no harm, may certainly eat what is the most agreeable to them. The rich eat early strawberries that cost 20s. a lb, early peas at 5s. a lb., and early potatoes at a shilling a lb., all of which can be bought later in the season at a tenth of the cost or less.

But the man who works 60 hours a week for a small wage, and has to keep a family should know how to procure the best and most nutritious food at the lowest possible price. His wife under the most favourable conditions has to consider every penny she spends. For such men and women the comments in this book are mainly intended.

HOW DO WE KNOW?

But, it may be asked, how do we know the true value of foods? Well, for a hundred years past, both in Europe and America, men of science have been making all kinds of experiments in order to find out.

In America the United States Department of Agriculture has made many thousands of experiments which have been conducted by men of high scientific ability and the results issued in a series of books and pamphlets. In England, in Germany, in France and elsewhere, men have given great attention to the science of food and feeding during recent years, and many volumes have been written on the subject.

From these we gather ideas of the true value of the various sorts of food and their effect on the body.

CHAPTER VIII.

FOOD STANDARDS.

THOUGH we have been told that “multiplication is vexation,” yet children are compulsorily taught arithmetic and all kinds of tables of weights and measures at school so as to fit them for the work of life. Now, as the health of men, women and children, and the welfare of the Empire, depend largely on people being properly fed, we may well spare a little time for the study of so important a subject, though there is no law compelling us to do so.

For the convenience of mankind, it has often been found necessary to fix certain measures. Thus we have the standard acre, yard, pint, pound, gallon, bushel, &c., which mean definite measures, and by the use of such measures we avoid the confusion that would otherwise exist.

MEASUREMENTS OF HEAT.

A measurement of heat is specially needed in considering the conditions of the body, and this is measured by a scale invented by Fahrenheit about two hundred years ago according to which freezing-point is fixed at 32 degrees above zero; boiling-point at 212 degrees above it, whilst the proper heat of the body in health is about $98\frac{1}{2}$ (98.4) degrees. Centigrade by which the French and some other nations measure heat is a scale starting from freezing-point at zero and ascending to boiling water heat at 100 degrees.

When the doctor comes to see a feverish patient he

takes from his pocket a little instrument called a "clinical" thermometer (from the Greek word *kline*, a bed,) and puts it in the mouth or under the armpit of the sufferer and "takes the temperature."

Thus he finds out the heat of the body, which it is necessary for him to know in order to prescribe.

In the same way it is necessary to have an instrument to find out the heat given forth from the body in order to know the value of foods put into it. In this way we are able to tell, amongst other things, what are the best and cheapest foods to eat.

Such a machine has been invented called the Calorimeter, the name of which is derived from two Greek words, *calor*, heat, and *metron*, a measure. From the same word *calor* the term Calorie has been adopted as the definition of a certain quantity of heat or energy.

A Calorie (the great Calorie or Kilo-Calorie, as it is called) means the amount of heat required to raise a pound of water four degrees Fahrenheit.

Let us see what that means. A pound of water is 16 ozs. and a pint is 20 ozs. Now, if we wanted to boil a pint of water ($1\frac{1}{4}$ lbs.) which when drawn from the tap or well was 52 degrees, we should need 50 Calories, for if 40 Calories are needed to raise 1 lb. 160 degrees, it will evidently take 50 to raise $1\frac{1}{4}$ lb. or 1 pint 160 degrees. That will give some idea of the heat value of a Calorie.

If, instead of reckoning the heat value of a Calorie, we want to express its mechanical power, it is usual to say that a Calorie is equal to 3077 foot-pounds or nearly one and a half foot-tons; in other words, that a Calorie of heat will lift one and a half tons one foot.

GOVERNMENT STANDARDS.

To many people this will not convey a very clear idea, so let us put the matter in the way adopted by the Government in their book on Workhouse Diets.

"For a healthy, able-bodied man of average weight—(150 or 160 lbs.)—300 foot tons, equivalent to a walk of about 16 miles on the level at the rate of three miles an

hour, is usually regarded as the mechanical equivalent of an average day's work." In other words, if a man walks 16 miles on a level road that would represent an average day's work. Raising a ton one foot is the same as raising a cwt. twenty feet, or the same weight five feet four times. The same exertion would be required for raising one stone (14 lbs.) five feet thirty-two times and anyone can test what this means. Lifting one stone to a height of five feet 960 times would then be the same as lifting 500 tons one foot or 300 "foot tons." And, according to the Government estimate, this would be an average day's work.

The Government, it would seem, fixes a fairly easy standard of labour for those in workhouses, as a man working really hard can get through an equivalent of 625 foot tons—more than double the Government requirement. The Connaught labourer, who comes over yearly to the North of England in the summer and often toils at piece-work in the fields from early morning till late at night, would probably get through two or three times the amount of work required by the Government standard, whilst the man who walks from London to Brighton in the day (and some men of over 70 years of age do this), would equal three days' Government labour.

VARIATION IN REQUIREMENTS.

At some length I have tried to explain the value of a Calorie because it enters into all our calculations for estimating the food requirements of the body.

If I succeed in showing how we can get the 3000 Calories of energy we want daily for the body for 3d. instead of 1s., it is far better than showing how a quart of six ale can be got for 2d., though it may not be so popular.

I think I may now talk about Calories with a quiet mind in the belief that the reader will understand what the term means.

The general rule is that a man needs food that shall

produce 2000 to 4000 Calories a day, though in exceptional cases the figures may fall as low as 1000 and rise as high as 8000.

It will vary, of course, according to circumstances, and will depend on the size of the man, his age, the part of the earth he inhabits, the amount of work he is doing and finally on his individuality. For strange though it may seem it is nevertheless a fact that if you take two men as alike as two peas in a pod, one man will probably need a different amount of food from the other to produce the same amount of work, and the variation may be so great that one of the two men will only need one half of what the other requires.

So we can only talk of the *average* amount men want, not of the *actual* amount any particular man requires.

We shall come across many exceptions to the general rule, though they are neither "sports" or "freaks."

For we see some little men and little women thin as laths and pale as cream-cheeses, "putting away" a big lot of food and doing no great amount of work. We also see big men and women in excellent health and in very good condition eating comparatively little and yet doing a very good day's work.

To be in proper condition a man must not be all skin and bone or fat as a prize ox. A medium-sized man weighing 15 stone should need, if anything, less, not more food than a man in proper condition for he has laid up a store of fat on which he could draw in case of necessity.

In regard to calculations of the value of foods, not only do the estimates of experts differ somewhat, but the actual composition of different kinds of similar foodstuffs varies very widely. An instance of this will be found in the following table comparing the value of bread made from Oregon and Oklahoma wheat :

		Protein per cent.		Carbohydrates per cent.
Oregon Flour	...	5'70	...	52'39
Oklahoma Flour	...	10'60	...	46'11

CHAPTER IX.

HOW THE REQUIREMENTS OF THE BODY ARE TESTED.

To an ordinary man it would seem as difficult a task to measure the amount of heat and energy produced in a man's body by different foods as to harness Niagara or weigh the earth. Yet these things have been successfully done. The Falls of Niagara are utilised for the production of electricity equivalent to the work of tens of thousands of horses ; the earth has been weighed by scientific instruments which are perhaps as reliable as the scales in our kitchens.

The heat produced by the food we eat is measured quite as accurately by the Respiration Calorimeter, a heat-measuring machine for testing and analysing the elements that are given off by the human body. By means of this instrument the amount of heat produced in the body can be measured to a nicety. That is a remarkable product of recent science ; and more wonderful still is the Respiration Calorimeter laboratory, invented, and perfected after many experiments, for calculating the heat and energy produced by the body. The person who is the subject of the experiment is placed in a room with metal walls and cut off from all contact with things outside this chamber. Air is pumped into the room, which is tested and analysed as it goes in, and the air which leaves the room after the man has breathed it, is tested and analysed in a similar way.

The plan adopted in conducting the experiment is that man is placed in one of these rooms and stays there

for a day, for a week, or more, just as long as required for the experiment. The place is furnished as a bed sitting-room, its walls are of copper or other metal, the size is about seven feet long, four feet wide and six feet high. Food is conveyed to him in this chamber and here he works, feeds and sleeps. Records are kept of the heat given off from the body for its own requirements and for the production of mechanical energy. In this way men of science are able to ascertain the heat and energy produced by the different foods with which the man is supplied. And by a large number of such experiments they are able to decide the most nutritious foods to eat.

They know exactly what goes into the body ; they analyse all that the body produces in every form—the heat that is given off, the energy given out during work, etc.

The Respiration Calorimeter shows that the energy output of a fasting man doing no work is about 1500 calories, that is to say a man doing no muscular work requires about half the food that a man actively employed wants. Every muscular movement of the body naturally increases the output of heat and consequently adds to the energy requirements. It follows, therefore, that an extra 1,000 to 2,000 calories beyond the minimum of 1500 already mentioned are usually required to give the heat and force necessary for a man to perform his daily work, and an additional 1000 for a man doing very hard work. This, although the actual mechanical force exerted by a man only amounts to 200 to 400 calories a day.

HEAT AND WORK.

Now it is said that a steam engine gives in actual power about one eighth of the heat it produces, that is to say, if eight tons of coal are consumed in an engine we get one ton of that in actual energy ; the rest somehow goes to waste. So that if we make use of one tenth of the entire heat produced in the body from food

for actual work, the body as a machine compares very favourably with the steam engine considering the large amount of heat we need to keep the body alive and in proper order.

As I shall speak of a gram (often spelt gramme) in this chapter and elsewhere, it may be well to explain what it is. The word is often employed in this country now, and will be more largely used when we adopt the metric system of weights and measures. This system takes its name from metre (a measure of about 39 inches) which is a ten millionth part of the assumed distance from the Equator to the North Pole. It was adopted by the French Government in the year 1795.

A gram weighs the same as the thousandth-part, or one cubic-centimetre, of a litre ($1\frac{3}{4}$ pints) of water. I should have to write a book instead of a paragraph to explain the entire system clearly. So I shall merely state the fact, and not try to tell why it is, that in practice this system is so useful. It is like decimals or a compass, quite incomprehensible to those who don't understand them, but very handy to use for those who need to use them.

Let us compare grams, grains, and ounces.

There are 454 grams or 16 oz. in 1 lb.

There are 7,000 grains in 1 lb.

There are $15\frac{1}{2}$ grains in 1 gram.

There are $437\frac{1}{2}$ grains or $28\frac{3}{4}$ grams in an oz.

To give a better idea of these weights I may say that the following are (within a fraction) the weights of some of the coins of the realm.

A threepenny-piece weighs 22 grains or about $1\frac{1}{2}$ grams.

A sixpenny-piece weighs $43\frac{1}{2}$ grains or about 3 grams.

A halfpenny-piece weighs $87\frac{1}{2}$ grains or about $5\frac{2}{3}$ grams.

A penny-piece weighs 146 grains or about $9\frac{1}{2}$ grams.

A crown-piece weighs 437 grains or 28 grams. or nearly 1 oz.

$10\frac{1}{2}$ d. in bronze coins weighs 100 grams, 48 pennies or 16 crown-pieces weigh about 1 lb.

In looking at some of the tables of food values

in which decimals are used some readers may not understand what the dot before certain figures means.

The old rhyme previously quoted, finishes by telling us that

“ Fractions drive me mad.”

So as in the calculations given in various places in this book decimal fractions are introduced, a word may be useful to men and women who have forgotten what little they knew on the subject at school.

Decimal is derived from the Latin word *decimus*, the tenth, and when we want to express tenths we can do so by fractions, thus $\frac{5}{10}$ meaning 5 tenths (or one half); or by decimals thus .5 meaning just the same as $\frac{5}{10}$. A dot, or decimal point, placed before a figure signifies that it is one tenth of what that figure would mean if it stood alone.

Thus 1 lb. means a whole pound but .1 lb. means the tenth of a lb., or about $1\frac{1}{2}$ oz.

If we want to show a still smaller fraction in decimals an o with a decimal point in front of it is placed before the figure and that divides it into hundredths (or ten times ten) for .01 only equals $\frac{1}{100}$ (one hundredth), and .001, one thousandth and so on.

Now, before finishing this chapter on Standards, I want to say a word as to the way food is valued from an £ s. d. point of view in comparison with its yield in protein, fat and carbohydrate.

Mr. J. Alan Murray has written a very thoughtful book, “The Economy of Food,” which is well worth perusal.

After a careful study of Atwater, Langworthy and others, Mr. Murray comes to the conclusion that the pecuniary value of food should be thus estimated:—

- 1 lb. of Protein costs as much as 5 lbs. of fat, or 20 lbs. of carbohydrate;
- 1 lb. of Fat costs as much as 4 lbs. of Carbohydrate, or 1·5th of a lb. (rather over 3 ozs.) of protein.
- 1 lb. of Carbohydrate costs as much as $\frac{1}{4}$ lb. of fat, or 1·20th of a lb. of protein.

CHAPTER X.

DAILY WANTS OF THE BODY.

Let us now consider what the body wants for its sustenance.

Protein—for flesh-forming, and body-renewing.

Fat and Carbohydrates (carbon, hydrogen and oxygen) for heat and energy.

Mineral Salts—to keep the blood pure, form bone, &c.

Brain, bone, blood, muscle, tissue, and sinew, are all built up and kept in going order by the food we eat. The body builds and repairs itself from the food it consumes, and if left without food it can feed on itself—for a time.

The moment food is placed in the mouth, chemical changes begin, during which the food is digested and the various wants of the body are supplied. If care is taken not to over-eat or under-eat to excess, the body is kept free from many ailments which otherwise occur. Those who forget what a delicate and marvellous machine the body is, and starve or choke it, have to pay the penalty.

The body absorbs from the food the protein it needs for its renewal, the fuel required for supplying heat and energy and the mineral matter necessary for the formation of bones and teeth.

FOOD CONSUMED BY VARIOUS NATIONS.

From an interesting statement, compiled by Dr. Langworthy, the American expert, and issued by the United States Department of Agriculture, we get the following information as to the total protein and energy

produced from the food consumed daily by working men of different nationalities during experiments that were carried out and recorded.

				Total Protein. Grains.	Energy Utilised. Calories.
England	...	...	...	1370	2685
Scotland	...	...	...	1663	3228
Ireland	...	...	...	1509	3107
United States	...	...	...	1540	3425
Canada	...	...	...	1663	3480
West Indies (Light work)	...	...	...	1263	3085
Java	Ditto	...	...	1124	2500

These figures are based on actual experiment. But it is probable that the English working-man's average consumption of food would have been found somewhere about as high as the Scottish and rather more than the Irish working-man's average, had the experiments been extended over a larger area. For example the men chosen for experiment in Ireland were well-to-do workmen and their food would possibly not represent the *average* diet of the Irish working-man, in both town and country districts.

SOME CALCULATIONS.

But the general result is valuable as showing that the estimate mentioned on an earlier page as to the amount of building and energy material necessary for the body is confirmed by facts gathered from experiments of the amount of food actually consumed by working men in various countries of the world.

A man lying in bed or working at a desk will naturally be using up less energy than a man cutting timber, carrying heavy loads or employed in labour where great manual exertion is necessary.

A certain amount of waste happens in the preparation of food in the household and also in the passage of food through the body, owing to its nutriment not being fully absorbed. This waste has to be taken into account

in estimating the daily requirements of the body. Thus :

	Grains Protein.		Calories of Energy.
If the food purchased provides	115	and	3800
As eaten it provides ...	100	„	3500
And as digested	95	„	3200

Mr. Broadbent expressed the opinion that men, women, and children should take sufficient food daily to produce :—

	Grains Protein.	Calories of Energy.
For a man doing hard work	1900	3200
For a woman	1140	1920
For a boy of 12	950	1600
For a child 2 to 5	760	1280
For a child of 2	570	960

But he considered these quantities excessive in the case of men.

Naturally the amount of nutriment taken varies from day to day. Sometimes it is above, sometimes below the general average. Very few persons measure with scales the exact amount of food taken. Nature provides a very good barometer. Eat when you are hungry (if you can), leave off when you are satisfied (if you are wise), eat good plain food if you wish to live long, avoid excesses of food and drink, unless you are a fool. “Be temperate in all things” is advice that conveys true philosophy which few people heed, though they may be convinced of its wisdom.

Remembering that we are dealing with standards concerning the infinitely varying human body and not with mathematical tables, there is bound to be a large variation in the estimate of the amount of food men and women want to supply their needs.

CAN WE DO WITH LESS FOOD ?

Recent inquiries tend to show that the standards of food requirements hitherto fixed are excessive.

A series of experiments, bearing on this point,

carried out by Prof. Chittenden, Ph.D., the well-known American food expert, showed clearly that men can do better work and live healthier lives whilst eating **very much less food** than is usually consumed.

Professor Chittenden had under his charge for the purpose of experiment :

- (1) Six University professors and medical men as representatives of brain-workers ;
- (2) Twenty men from the Army Hospital Corps, as representatives of moderate muscle workers ;
- (3) Eight University Athletes, as representatives of moderate brain and excessive muscle workers.

The experiments continued for nine months (October, 1903 to June, 1904) and during that period each of the men was under constant scientific observation.

The object of the experiment was to test whether men could do a full amount of brain and muscle work whilst eating less food than was allowed by the accepted standards.

It was found that the eight athletes needed only 55 grams of protein daily (847 grains) the soldiers of the Army Hospital Corps only 50 grams (770 grains), whilst Dr. Chittenden himself required only 36 grams (554 grains).

The evidence in regard to the soldiers and athletes was especially interesting. The regulation daily diet of the American soldier was 75 ozs. of solid food, including 22 ozs. of butcher's meat. This scale of diet was decreased during the period of the experiment to 51 ozs., of which only 1 oz. was meat. The athletes were also put on the same diet.

At the end of the nine months' experiment all the men were much stronger and in better condition. They had gained 50 per cent. in strength and they did their work with greater ease. Their health had improved, their spirits were excellent and none of them wished to go back to the old system of diet.

CHAPTER XI.

A TYPE FOOD CHART.

I have made a list of different kinds of food which I think would be most serviceable to persons who are wanting to live cheaply and well.

The foods are set forth in various types which are intended to give a clear idea of their comparative value when protein and energy value are taken into consideration.

Authorities are generally agreed that we cannot very well compare protein with energy in a single standard as they serve two distinct purposes. For instance we cannot say 100 grammes of protein is the same value as 3,000 calories of energy although a man requires that quantity of each daily ; because protein is a body builder and has a separate function from energy producers.

We can get 100 grams of protein from beans, oatmeal or flour for about 2d., and 3,000 calories of energy from dripping or sugar for about 3d., but we can draw no real deduction from this of the comparative values of these foods as whilst we are getting protein from the first mentioned we are getting about 2,000 calories of energy in addition, whilst from sugar and butter we get energy only and no protein.

This chart is founded on a consideration of the scientific value of foods for body-building and energy

with Mr. Murray's calculations before me and my practical experience to assist me.

It shows the comparative values of different kinds of Food by various sizes of type; the larger the type, the better the food having regard to its cheapness and nutritive qualities combined.

Beans

Peas

Lentils

Oatmeal

Wheat Flour

Maize Meal

Bread

Rice

Sago

Pearl Barley

Fresh Herring

Cheese
Macaroni
Mackerel
Butter Beans
Smoked Herring

Dripping
Sugar
Potatoes
Cheap Cuts of Meat
Salt Cod

Peanuts
Chestnuts
Margarine
Dates

Beef
Figs
Smoked Haddock
Bacon (Cheap Cuts)

Skim Milk
Currants
Raisins
Butter
Sago

Eggs
Fresh Milk
Corn Flour
Tapioca

CHAPTER XII.

THE CHEAPEST AND BEST FOODS.**BEANS, PEAS, LENTILS, OATMEAL, BREAD.**

FIRST among all our foodstuffs for cheapness combined with nutrition come beans, peas and lentils. After those bread and oatmeal.

There is no doubt about it. Hutchison and Eustace Miles, Atwater and Langworthy, Broadbent, Haig, Alan Murray, and the rest, all tell the same story.

The "Staff of Life," our daily bread, is dearer—even oatmeal yields less nutriment at the same cost than these invaluable food products known generally as legumes or pulses.

What a famous food expert once said to me puts the matter in a nutshell: "To live in the cheapest possible way, you MUST use beans, peas, or lentils."

Yet, how little they are used compared with their merits! Pea-soup is popular, haricots and lentils are used in small quantities, but they ought to form almost as large a proportion of the daily food of the great public as bread, and the person who popularises them will have done great service to the people.

In some Eastern countries the legumes are more fully employed than in Britain and America. The nutritious soy bean in particular is largely used in a variety of forms including cheeses and curds, flavouring for rice, etc., and other purposes. In this country the soy bean is used chiefly in dietetic foods.

Beans, peas, and lentils are about the same value so we can choose which we like for our food or vary them as we please.

The causes which go to make up the value of these legumes include

1. The small amount of water in them.
2. The large amount of protein they contain.
3. The great quantity of carbohydrates.
4. Their cheapness.

In regard to the first point mentioned, beef contains 50 to 75 per cent. (half to three-quarters) water ; whilst Haricot-beans contain 10 to 20 per cent. of water (from one-tenth to one-fifth) ; and Lentils and Peas, rather less than that.

Beef contains 18 to 20 per cent. protein.

Beans, peas and lentils contain about the same, sometimes as much as 23 per cent.

Beef contains 600 to 1100 calories to the pound, Beans contain 1600 or more.

Beef contains about 1 per cent. of ash (or mineral), Beans contain 2 to 4 per cent.

Therefore, however we compare beef with beans, peas or lentils, we find that the latter at 2d. a lb. equal or superior to that useful but over-estimated product beef all along the line.

If anyone doubts this let him refer to pages 62, 63, 234 of Dr. Hutchison's "Food and Dietetics." The book costs 16s., but a middle class family studying and using it consistently might save its cost in a week and even some working-class families might do so within a month, to say nothing of the help they would be able to give others by possessing a proper knowledge of food values and of the enormous prices paid for some manufactured articles which in their simple natural form are very cheap.

For instance, in the book I have mentioned a patent food is described and analysed (made mainly from lentils) which costs 3s. 6d. a lb., whilst pure lentil-flour its equivalent in nutritive value, costs 2½d. a lb. !

Patent foods may be of great use to invalids and worth their money to the rich, to whom expense is of no concern, but let us note the fact that the poor can

get for one-sixteenth a food of equal value ; that is to say, their 1s. 3d. will equal the £1 of the well-to-do.

THE STAFF OF LIFE.

Of bread I need say little for its value is fully appreciated by rich and poor.

It is handier to use than beans and peas as we can buy it readily from the baker.

In doing so of course we have to pay more for the "staff of life" than if the flour were made into dough and baked at home. It is a great pity the custom of baking at home is not more generally adopted.

The home-made bread baked in Irish cottages is not only excellent in quality but delicious in flavour. To the wheat-flour some maize flour is usually added and it is baked in flat loaves in a pot-oven. I have never tasted better bread, either at home or on the Continent.

The difference in nutritive value between wheatmeal, oatmeal, and pearl barley is not very great as may be seen from the following statement of the contents (roughly) of 100 parts of the three cereals.

	Water.	Protein.	Fat.	Carbo.	Cellu.	Ash.
Wheatmeal ...	12	12 $\frac{3}{4}$	1 $\frac{3}{4}$	70	1 $\frac{1}{2}$	1 $\frac{1}{4}$
Oatmeal ...	7	14 $\frac{1}{4}$	7 $\frac{1}{2}$	66	3 $\frac{1}{2}$	1 $\frac{3}{4}$
Pearl Barley	12 $\frac{1}{2}$	7 $\frac{1}{2}$	1 $\frac{1}{4}$	77	1	1 $\frac{1}{4}$

Oatmeal yields a higher percentage of protein and is far richer in fat than the other two cereals. It contains less water and is richer in mineral matter (or ash) and in cellulose.

Cellulose has a considerable value. It forms the basis of vegetable tissues and is in many respects allied to starch. It is of great use to persons in good health as a stimulant in keeping the bowels in good order, whilst to those who suffer from sluggishness in the intestines producing constipation it is most valuable. To the latter a certain amount of cellulose, derived from green vegetables, wholemeal or brown bread, fruit, or otherwise, is a necessity.

The protein in the cereals (wheat, oats, barley, etc.), is not only of great value but on an average is only

one quarter the cost of protein derived from animal sources.

Whether for cheapness or nutrition, oatmeal, wheat-meal, and barley are amongst the best and cheapest articles of our food supply.

STANDARD BREAD.

How far we suffer as a nation in our preference for a pearly white bread is too big a subject to be considered here. I will only quote what Dr. Hutchison has recently written on the subject :

“ Judged entirely from the standpoint of nutriment, the old-fashioned household bread, which is not brown but cream-coloured, and which includes both the germ and the semolina, is without doubt the best bread for general consumption.

“ Such a loaf is certainly superior to the ordinary white bread from the chemical point of view, while it is in no way inferior to the latter in digestibility and capability of absorption.

“ The retention of the germ, which is rich in proteids, is of great importance if the bread is to be a complete food. The great drawback to the ordinary white bread is its deficiency of proteid and excess of starch. When the germ is retained this deficiency is to a great extent corrected.”

Dr. J. M. Hamill in his report to the Local Government Board on the nutritive value of bread, says :
“ There is no reason to consider that the varieties of bread which the miller and baker have accustomed us to regard as of lower quality—‘ household’s ’—for example, are in any physiological sense inferior to that of the higher priced bread made from high grade and specially white flour. On the contrary, from the point of view of available nutrient material and energy value, the advantage is on the side of the ‘ households.’
‘ Entire ’ wheat flours (including stone-ground flours and ‘ standard ’ flour, are in nearly the same position as ‘ households.’ ”

CHAPTER XIII.

EVERYDAY ARTICLES OF DIET.

MILK AND EGGS.

When I was living on threepence a day I bought milk but not eggs, bread but not potatoes, margarine but not butter, sugar but not jam, beans but not beef.

I want to explain why, for in the usual way potatoes, eggs, butter, jam, and meat of some kind would occupy a place on the table of the householder, be he rich or poor.

Now it must be borne in mind that my experiment was carried out in a town, not in the country where the cottager and the farmer alike grow potatoes and keep hens so that potatoes and eggs form naturally a portion of their diet.

In the town, however, it is necessary to consider, when we have a very small amount to live on, what foods give the greatest nutriment at the least cost.

MILK.

Milk is one of the most perfect foods we have. That is to say: it supplies protein, fat, carbohydrates, mineral-matter, and water—though not in the exact proportion required by the body, yet as nearly, perhaps as in any other article of diet. But it is not a cheap food by any means even when it can be bought at 3d. a quart.

When it can be obtained in the form of skim or separated milk it is decidedly cheaper. This can usually be bought in country villages at 1d. a quart

sometimes at 1d. the half-gallon, in which case it is one of the cheapest foods in existence.

It comes as a surprise to most people that milk loses a comparatively small amount of its value by having the cream removed. Yet this is so—and if we were living mainly on milk there would be an advantage in having some of the cream removed, for milk regarded as a “perfect” food is for adults too rich in fat.

Let us examine the relative value of a pint and a half of skim-milk (at 1½d. a quart) and three-quarters of a pint fresh milk at 3d. a quart, each costing about 1d.

The skim-milk gives us 400 grains of protein and 330 calories of energy; and the fresh milk gives 200 grains of protein and 300 calories of energy.

When fresh milk costs 5d. a quart it can only be regarded as a luxury or an expensive article of diet, and we get, of course, far more nourishment for a penny spent on beans, peas, bread, or oatmeal, than on milk.

Whilst skim-milk is rather richer in protein than fresh milk, it falls short in fat, which is removed by the separator in the form of cream. About one twenty-fifth part of milk, and (more or less) one fifth of cream consists of fat.

Those who have been eating bread and milk all their lives (perhaps with a bit of sugar in it) did not know probably that this is one of the most perfect forms of food possible.

It is a strange fact that there are more than a million tiny globules of fat in a drop of milk.

Casein, which is found in milk, is a substance extremely valuable on account of the protein it contains and is used in various food preparations. It is also being treated by means of a recent invention, in such a way as to be used for door handles, door-plates and other articles for the household! In this form its commercial value is said to be nearly double what it is when employed for food.

The chief difference between whole and skim-milk is that the fat is nearly all taken out of the skim-milk,

and this can be very cheaply supplied for adults, without any loss of efficiency, by dripping, margarine or butter.

For little children the case is different. There is nothing like milk as a natural diet. Human milk is best of course, but failing that cow's milk is valuable.

COMPOSITION OF FOOD MATERIALS: MILK AND CREAM.

EXPLANATORY NOTES.

It will be observed from this Chart how little, except in energy or fuel value, milk loses from being skimmed or separated. Thus the four articles illustrated on the Chart, viz., Whole Milk, Skim Milk, Butter Milk, and Cream, contain the following in every 100 parts :—

	Water.	Protein.	Fat.	Carbo.	Ash.
Whole Milk	87.0	3.3	4.0	5.0	0.7
Skim Milk	90.5	3.4	0.3	5.1	0.7
Butter Milk	91.0	3.0	0.5	4.8	0.7
Cream	74.0	2.5	18.5	4.5	0.5

Fat is not a body-builder but only an energy producer. For adults therefore skim or separated milk is far more economical than whole milk as the amount of fat extracted by separation can be so cheaply supplied by dripping, margarine or butter. For young children, however, whole milk is much to be preferred.

Ass's, goat's, or mare's milk each has its special qualities whilst preparations adapted to the needs of all sorts and conditions of human beings can be bought.

Mother's and cow's milk each contains about 87 parts of water. Cow's milk is richer in protein, mother's milk in sugar.

The following table will show the difference between

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COMPOSITION OF FOOD MATERIALS.



Protein



Fat



Carbohydrates



Ash

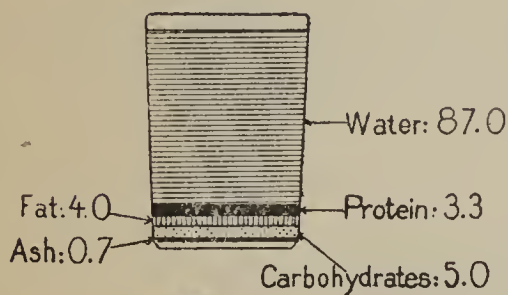


Water



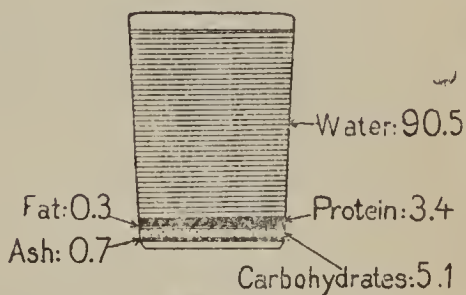
Fuel Value
1 Sq. In. Equals
1000 Calories

WHOLE MILK



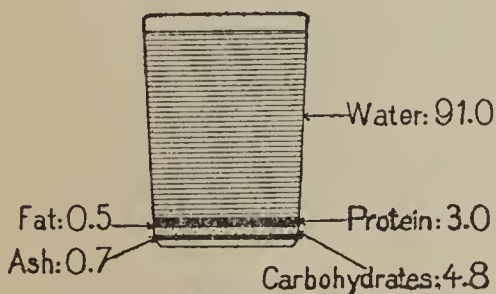
FUEL VALUE: 310 CALORIES PER POUND

SKIM MILK



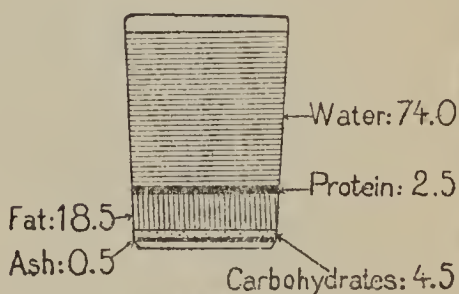
FUEL VALUE: 165 CALORIES PER POUND

BUTTERMILK



FUEL VALUE: 160 CALORIES PER POUND

CREAM



FUEL VALUE: 865 CALORIES PER POUND

MILK AND CREAM.

Small reproduction of a Chart issued by the U.S. Department of Agriculture.

cow's milk and mother's milk. In every 100 parts, besides about 90 parts of water, there are :

	Fat.	Sugar.	Protein.	Ash.
Human milk	$3\frac{1}{2}$	$6\frac{3}{4}$	$\frac{3}{4}$	$\frac{1}{8}$
Cow's milk ...	$3\frac{1}{2}$	$4\frac{1}{2}$	3	$\frac{3}{4}$

The subject of mother's milk brings us very near to first principles. It shows clearly as in the case of eggs, how Nature thinks of the young before all things. However poorly the mother is fed, she yet goes on supplying milk for her babe. She may be so scantily fed as to be suffering the pangs of starvation, but she produces milk, though the very tissues of her body are used up to supply it.

COMPOSITION OF FOOD MATERIALS : EGGS AND CHEESE.

EXPLANATORY NOTES.

The points clearly illustrated in these diagrams are :

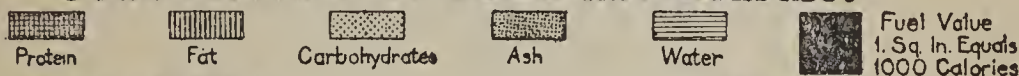
1. The high value of eggs, in protein and the richness in protein and fat of the yoke.
2. The great fuel, or energy, value of cream cheese and its excellence both in regard to protein, fat, and ash.
3. The comparatively high protein value of cottage cheese, though by removal of the cream the fuel value has been greatly reduced.
4. "Cottage Cheese" is a home-made sour-milk cheese.

Eggs though most valuable as a food, especially for invalids and children, are not economical articles of food. They are most expensive perhaps, to the town householder who keeps a few fowls on unscientific principles, when eggs are apt to cost 3d. a piece or more ; cheapest when hens are kept by cottagers in the country

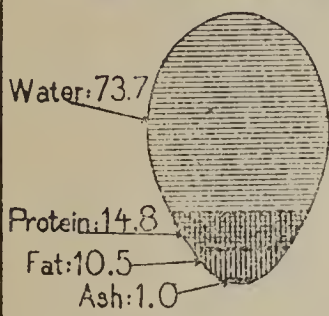
U.S. Department of Agriculture
Office of Experiment Stations
A.C. True: Director

Prepared by
C.F. LANGWORTHY
Expert in Charge of Nutrition Investigations

COMPOSITION OF FOOD MATERIALS.



WHOLE EGG

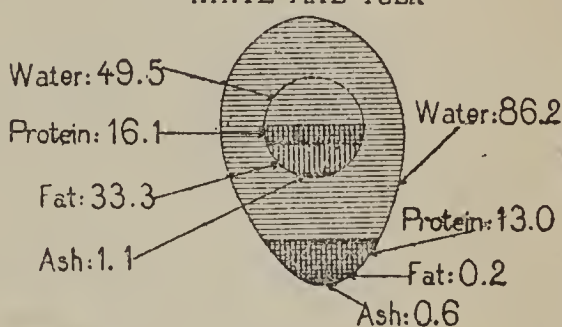


FUEL VALUE OF
WHOLE EGG:



720 CALORIES
PER POUND

EGG WHITE AND YOLK



FUEL VALUE OF YOLK:



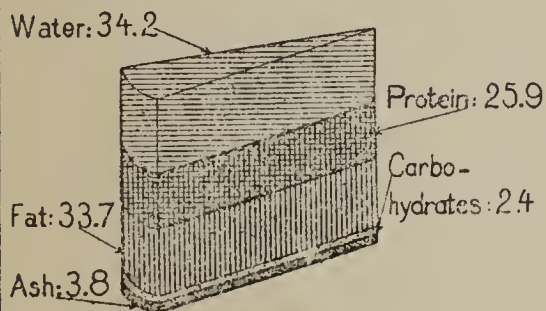
1705 CALORIES
PER POUND

FUEL VALUE OF WHITE:



250 CALORIES
PER POUND

CREAM CHEESE

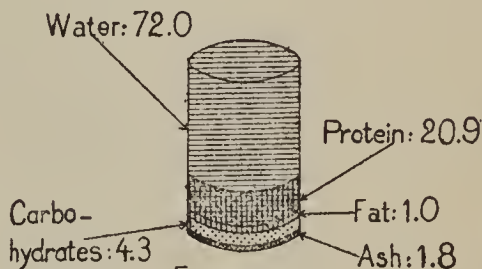


FUEL VALUE



1950 CALORIES PER POUND

COTTAGE CHEESE



FUEL VALUE



510 CALORIES PER POUND

EGGS AND CHEESE.

Small reproduction of a Chart issued by the U.S. Department of Agriculture.

where they can get a run by the roadside or in the fields. Their food then costs little or nothing : indeed an Irish cottager in purchasing stock, specially asked for fowls that were least likely to be seen in the cornfields !

The old saying that “ an egg is full of meat ” is quite true. It is indeed a wonderful structure. The yoke contains about one-half water, one-third fat, one-sixth protein, and one per cent. of ash. Nine different mineral substances are contained in the ash, chief of which are phosphoric acid, lime, potassium, and sodium, the other minerals it contains being magnesium, oxide of iron, sulphuric acid, chlorine, and fluorine.

Few of us in eating an egg perceive the tiny speck representing the future chick. Yet all the rest of the egg is so framed as to give food and protection to this germ, while it is growing into a chicken. Its food is ready to hand as life springs into being ; there are spaces in the egg and the shell is porous, so that the chick may have air to breathe.

The weight of eggs varies with different breeds, but the average is one-and-three-quarters to two ounces each and eight or nine usually go to the pound.

When good fresh eggs can be purchased at a penny each or 9d. a lb., they are not only an excellent but a fairly economical article of diet.

The yoke of an egg, it may be remarked, is especially valuable. The phosphoric acid and iron it contains form a useful tonic for persons whose blood is poor.

There is a fashion in this, as in other foods, for most persons choose an egg with a brown shell in preference to one with a white shell. Yet there is absolutely no difference in quality between the two.

Lightly-boiled eggs are more easily digested than those which are hard-boiled and a raw egg beaten up most digestible of all.

The usefulness of eggs is not to be judged only by their nutritive value. They can be prepared in a dozen ways so as to make varied and appetising dishes, and are exceedingly useful as an article of diet for invalids.

CHAPTER XIV.

THE BEST ENERGY FOODS.

BUTTER, MARGARINE, DRIPPING AND CHEESE.

The first time I ate margarine was unknowingly : I thought it was very good butter. The flavour of margarine is quite agreeable and though many people dislike the idea of eating it, that arises from sentiment. It is very doubtful if four people out of five would know the best margarine from butter if these two kinds of fat were put on the table without comment.

During the forty or fifty years which have elapsed since margarine was first placed on the market, it has found increasing favour with the people and it is now regarded as one of the most useful articles for the supply of energy to the poorer classes.

Margarine is made from the fat of animals (mainly bullocks) which, after being prepared, is mixed in this country, with a small amount of milk and coloured matter as to give it the flavour and appearance of butter. Here is its actual composition compared with butter :—

				Water.	Fat.	Protein.	Ash.
Margarine	...	...	...	9½	83	1½	6
Butter	...	...	...	11	85	1	3

The fuel value of butter and margarine is high, yielding over 3,500 calories per lb., and they are practically equal in nutritive value.

Dr. Hutchison commends margarine because it is free from certain fatty acids and casein which occur

in butter. These acids in case of rancid butter, may cause irritation in the stomach and the latter tends to decompose butter. He expresses a hope that the prejudice against margarine may quickly disappear, as it is a cheap and excellent substitute for butter.

Margarine is less than half the price of butter. I paid 5d. a pound for some which I found very good.

Nut butter is a useful article of food and popular with many people, but it is more expensive than margarine.

DRIPPING.

Dripping, which can be obtained even cheaper than margarine, is the best and cheapest of this group of fats so far as nourishment is concerned. A pound more than equals a pound of butter. By melting down fat bought from the butcher's it can be made for $4\frac{1}{2}$ d. a lb. or rather less. Not only children but grown-up people find dripping and bread very satisfying and pleasant, and it is hardly possible to get a cheaper meal.

"Father likes drip," said a little boy of my acquaintance, with whom I was discussing the problem of cheap living. "Mutton-fat," he added, "can be got for $2\frac{1}{2}$ d. a lb. and beef for $3\frac{1}{2}$ d. Mother mixes 'em."

CHEESE.

This is an energy food—and more.

Cheese is mainly composed of fat and casein. In it we get two very valuable substances together: fat the energy-giver; casein—an albuminoid substance most useful as a body-builder. It is too, a highly economical article of diet.

Cheese does not vary in body-building and fuel value according to its price, as may be seen by the following table showing the contents (roughly) in every 100 parts of certain well-known kinds. By "roughly" I mean taking the various constituents

to the nearest whole number without going into fractions :—

		Protein or Nitrogenous Matter.	Fat.	Water.	Fuel Value per lb. Calories.
Cheddar ...	...	33	27	32	2145
Canadian ...	...	33	31	27	2055
Dutch ...	...	31	18	33	1435
Roquefort ...	...	35	31	25	1700
Cream ...	...	9	36	32	1950

So that whether we pay 10d. to 1s. 4d. for Roquefort and Cheddar, or 6d. to 8d. for Dutch, Canadian or American we get practically the same amount of protein whilst the energy value is not very dissimilar.

Cheese contains about double the nutritive value of beef. Some authorities place it even higher than that.

From this it will be seen that cheese should be largely used in the household of the working classes instead of beef.

One great advantage of cheese for busy households is that (unlike beans, oatmeal, beef, etc.) it requires no preparation and no cooking. It does not turn sour like milk or cream, it does not go bad like meat or eggs with lapse of time.

CHAPTER XV.

POPULAR ARTICLES OF FOOD.

SUGAR, POTATOES, FISH.

SUGAR.

Sugar, bread and milk are three universal foods ; of these sugar is the most popular with all classes and with persons of all ages, whilst by reason of its heat-giving qualities it is one of the most important articles of diet, and a fairly cheap one when it can be bought at $1\frac{1}{2}$ d. or 2d. a lb.

In contrasting the value of sugar with other popular forms of food, we must recollect that, unlike milk, bread, beans, and oatmeal, it contains no body-building material (protein). It is a heat-giver only, except for a very small amount of mineral-matter.

The average price of cheap sugar may be regarded as 2d. a lb. It can be bought at times for $1\frac{1}{2}$ d. or less, and at others costs $2\frac{1}{2}$ d. or more. When it is as dear as $2\frac{1}{2}$ d. it must be used with care, for it ceases to be a cheap food. Jam and marmalade though very pleasant foods cost more than sugar, whilst their fuel value is less.

Long before tea was used in this country sugar was popular, but was a luxury of the rich, as its price in the early days was about 2s. a pound. Though it has been known less than a thousand years in this country it was used in China over two thousand years ago.

To-day, on an average, every man, woman, and child in the United Kingdom consumes about one-and-a-half pounds a week.

Sugar is practically all carbohydrate, that is to say,

it is composed of three elements, carbon, hydrogen, and oxygen: the two latter being in the same proportion as they are found in water—viz., two parts of hydrogen to one of oxygen; and cane-sugar is made up of 12 parts of carbon, 22 parts of hydrogen, and 11 parts of oxygen.

Children derive nourishment from sugar from the day they are born: mother's milk and cow's milk both contain sugar. They get also a good deal—often too much—in the form of sweets. The agreeable flavour of sugar is indeed liable to be found a disadvantage in some cases, for young children and others, often take it to excess and so place a strain on the digestive organs of the body.

Barley-sugar is sugar heated about 100 degrees above boiling-water heat. If heated still more sugar becomes less sweet and in this form is known as caramel.

Until about 1860 nearly all the sugar consumed came from the sugar-canes grown mainly in the West Indian Islands. Then Germany started to grow beet-sugar and soon, aided by science, succeeded in producing sugar that could compete with the product of the West Indies. To-day more than half of the sugar consumed comes from the beet-root and the amount produced yearly is enormous—about 14,000,000 tons. Quite recently the culture of the root has been introduced into England in order that we may be able to make our own beet-sugar instead of importing from abroad.

Many vegetable products are rich in starch besides potatoes and bread; and starch partly in the mouth and partly in the stomach, is changed into sugar in which form it supplies the body with energy. Sugar may indeed be looked upon as starch made ready for the use of the body. In the form of toffee we have one of the best forms of nourishment, consisting as it does of sugar and butter.

If not taken in too great quantity we get a full value from sugar for, whilst of some vegetable products about one-fifth is unabsorbed and thus wasted, in the case of sugar, 99 out of every 100 parts are used as fuel

by the body, only one per cent. being lost by non-assimilation.

Sugar has been found by many experiments to be especially useful when the body is undergoing excessive or prolonged work, and athletes, soldiers and persons having heavy work to do have found it very helpful.

POTATOES.

The high position which the potato enjoys owes much to the ease with which it is grown and cooked and its pleasant flavour. For the cottager who has a garden or an allotment it is a natural source of foodstuff.

We must never overlook the fact that an agreeable food has a value quite outside its use in furnishing building-material and fuel for the body, and, owing to the many forms in which the potato finds its way to the table, there is no more useful vegetable for variety; nor has been since it was introduced into Europe in the reign of Queen Elizabeth.

Let us compare the value of the potato with bread. First of all we must recollect that of the potato as purchased we lose about one-fifth in the form of refuse; skin, etc. Then we get, when the potato has been boiled:—

Of water, $75\frac{1}{2}$ per cent., in bread 35 per cent.

Of protein, $2\frac{1}{2}$ per cent., in bread $9\frac{1}{4}$ per cent.

Of carbohydrates, 21 per cent., in bread 53 per cent.

Of mineral, 1 per cent., in bread 1 per cent.

Of fat,—a trace; in bread $1\frac{1}{4}$ per cent.

Fuel value per lb. potatoes—about 400 calories; bread 1200 calories.

By fuel value we mean the amount of heat which is produced by the consumption of the articles.

In regard to their energy or fuel value, potatoes at a half-penny a pound, compared with bread at $1\frac{1}{4}$ d. a pound, (or 5d. for the quartern loaf) give only two thirds as much as bread, viz., 770 calories instead of 1030 for 1d, whilst when we come to the protein value the comparison in favour of bread is much more striking,

a penn'orth of bread giving nearly 600 grains and potatoes only 290.

WASTE IN PREPARING POTATOES.

Let us consider for a moment how we can get the largest amount of nourishment from the potato. It is made up of four sections: the skin; the outside layer half an inch or less thick; an outer and an inner central layer, the latter being sometimes called the core. Nearly one-tenth of the potato is made up of the outer layer.

Dr. Langworthy says that "one-fifth of the potato is on an average wasted in peeling," and adds, "when we recall how large is the proportion of water and how low that of nutrients, and also that the larger proportion of the valuable protein and mineral-matter is in the outer layers, this waste appears more important than is generally realised."

By far the most economical way to boil potatoes, is in their jackets, when they lose only one hundredth part of their protein and one thirty-third part of their ash. This fact is lost sight of by many housewives who for some reason will not cook potatoes in their jackets.

The potato is quite unsuited to form the exclusive food of man and, however valuable, is far from a perfect food as it supplies far too little body-building material in proportion to the energy it yields.

FISH.

For those who like animal food, and to whom economy is necessary, there is nothing so cheap as fish.

Even if we have to live on 3d. a day we can afford a "two-eyed steak" as the herring is familiarly called, for I have bought a couple of excellent, though small, kippers for a penny. Half a kipper for breakfast gives an agreeable flavour to a "doorstep" (thick slice of bread).

Of course we must select our fish. We cannot afford turbot and salmon at 1s. to 2s. per lb., but the haddock and herring will serve our purpose equally well at a quarter the cost. Let us examine the nutritive value

of a few fish in the state we buy them. Every hundred parts of the following kinds of fish contain:—

				Water.	Protein.	Calories. per lb.
Salmon	...	...	...	41	15	660
Turbot	...	...	...	37	7	460
Herring	...	...	...	42	11	375
Haddock (fresh)	...	...	...	40	8	165
Cod	...	...	...	39	8	165
Eels (salt water)	...	...	...	57	15	580
Mackerel	...	...	...	40	10	365

The other portion of the hundred parts goes in waste or refuse—skin, fins, head, tail, bone, etc.

COMPOSITION OF FOOD MATERIALS: FISH.

EXPLANATORY NOTES.

Amongst the points of interest shown by the Chart are:—

1. The high nutritive value of smoked herring.
2. The usefulness of mackerel as an article of diet.
3. The small value of the expensive oyster.
4. The greater nutritive value of salt, as compared with fresh, fish.

Our “two-eyed steak” when smoked contains only 19 per cent. of water and 20 per cent. of protein, whilst its fuel value per lb. is 750 calories as purchased whilst the value of the edible portion will be seen in the opposite chart.

From an economical point of view there is nothing like the herring, fresh or smoked, bloater or kipper. If mackerel can be bought at 2d. a lb. it is just about twice as cheap as meat, and it may be stated that four-pennyworth of haddock yields as much nutriment as eighteen pennyworth of sole.

U.S. Department of Agriculture
Office of Experiment Stations
A.C. True, Director

Prepared by
C.F. LANGWORTHY
Expert in Charge of Nutrition Investigations

COMPOSITION OF FOOD MATERIALS.



Protein



Fat



Carbohydrates



Ash

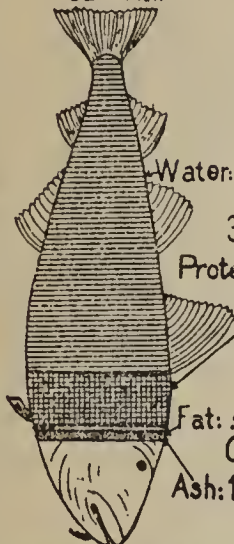


Water



Fuel Value.
1 Sq. In. Equals
1000 Calories

COD Lean Fish



FUEL VALUE:



Water: 82.6

325 CALORIES PER POUND

Protein: 15.8

Fat: 4

Ash: 1.2

Water: 86.9

Carbohydrates: 3.7

OYSTER



FUEL VALUE:



Water: 53.5

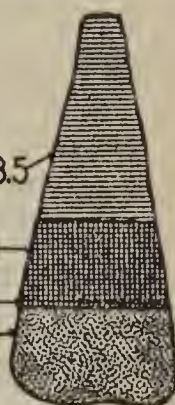
410 CALORIES PER POUND

Protein: 21.5

Fat: .3

Ash: 24.7

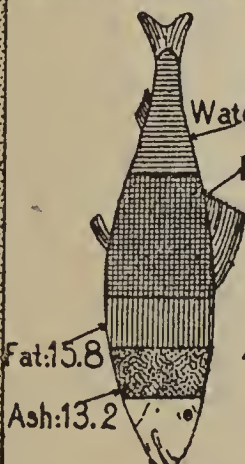
SALT COD



MACKEREL Fat Fish



SMOKED HERRING



Water: 34.6

Protein: 36.4

Fat: 15.8

Ash: 13.2

FUEL VALUE:



235 CALORIES PER POUND

Water: 73.4

Protein: 18.3

FUEL VALUE:



645 CALORIES PER POUND

Fat: 7.1

Ash: 1.2

SOME VARIETIES OF FISH.

Small reproduction of a Chart issued by the U.S. Department of Agriculture.

CHAPTER XVI.

WHAT IS THE REAL VALUE OF BEEF-TEA ?

Anyone who begins to enquire into the nutritive value of foods must be prepared for shocks. Some of their idols are bound to be overthrown. In no other direction will the shock of surprise be greater than when they come to know the nutritive value of beef-tea and similar preparations.

By many persons beef-tea is considered a kind of essence of beef containing every good thing that was in the meat. As to the "refuse" which remains after stewing that in their opinion is mainly waste matter and may be thrown away without much loss taking place.

So far from this being the case the fact is that if sixpennyworth of beef is stewed for beef-tea one gets about a pennyworth of its nutritive value in the tea. For beef-tea, however carefully prepared, contains very little nourishment. The virtues of various extracts of meat have been widely advertised, but Dr. Hutchison states that so far as their value as body-builders is concerned it would be as useless to attempt to build up tissues from them as it would be to construct a house out of sand and that they cannot be dealt with in the body in such a way as to produce heat and energy.

That is no reason why we should despise beef-tea : it is a very useful preparation for invalids and may be of great value, though it is necessarily expensive.

As a stimulus to the appetite, as a help to the body in digesting other and more nutritious foods it is quite

valuable and persons who find plain food uninteresting may be tempted to eat by its use.

Beef-tea and meat extracts play a useful part too, for flavouring, and, like pickles and sauces, help to give persons an appetite. We must beware, however, against relying on them to build up the body.

The same remarks apply equally to beef-juices. They are very costly and contain very little real nutriment.

“It is really pathetic to see poor people in cases of illness paying large sums for so very small a return,” says Dr. Hutchison. White of egg is a cheap and nutritive food and an excellent substitute for beef extracts in the case of sickness.

A pennyworth of white of egg will give nourishment which would cost 2/- if beef-tea were purchased instead.

An invalid would actually require about seven shillingworth daily of beef-tea to supply the protein necessary for keeping the body in efficiency. The same nutriment for tenpence could be obtained from milk.

As to artificial beef-juices they are if anything less to be relied on than beef tea. Dr. Hutchison states that they can only be of service when for some special reason milk cannot be used. Having regard to the slight nutritive value of beef-juices their cost even when home-made, is very large, but of artificial beef-juices the cost is infinitely more being as high as one hundred times or more the cost of home-made juices in some cases.

Dr. Haig makes war on beef tea in common with soups, meat extracts “and other deadly decoctions of flesh” on account of the uric acid they contain.

Such articles of food will probably be beyond the reach of the poor, but even the middle classes might with advantage study the comparative value and cost of beef-teas, beef-juices, and beef essences if they would do their best for those whose strength they are seeking to restore.

CHAPTER XVII.

DRINKS.

WATER, TEA, COFFEE, COCOA, ETC.

A good deal of the pleasure and refreshment of life comes from drinking. I should divide drinks for healthy people into classes :—

1. Harmless and pleasurable : water and mineral-waters, lime-juice, and the like.
2. Beneficial and pleasurable : milk, cocoa, chocolate.
3. Pleasureable and usually harmless : tea, coffee.
4. Pleasureable, but often harmful : wine, beer, spirits.

Fortunately the water supplied in the leading towns both in England and on the Continent is as a rule, pure and good, and far more reliable than it was.

Hot water with or without a little milk, a lump of sugar or piece of lemon for flavouring, is a good and pleasurable drink in cold weather.

The simpler our drinks are the better. It is unwise to get the “pickle” habit, either in drinking or in eating.

TEA.

After water the most popular drink in Great Britain is Tea. We are a nation of tea-drinkers, especially in Ireland, where tea usually figures as a very prominent item in the expenditure of the working-class household. In my scheme for living on threepence a day I included

it because, after all, if we have to live hard and cheaply, that is no reason why we should not enjoy ourselves.

Should tea be regarded as a food? Hardly, for the nourishment in it is very small. Yet it helps us to eat our food with relish, it stimulates us, and refreshes the life of the toiler. The anticipation of a cup of tea is worth as much as the tea itself. Those who drink tea with milk, or with milk and sugar, get some real nourishment in a pleasing form.

Many people will hold with what Sydney Smith wrote about tea: "Thank God for tea! What would the world do without tea? How did it exist? I am glad I was not born before tea."

Why do we drink tea? Not for its nutritive value but because it is an agreeable stimulant to the brain without the evil effects of alcohol.

The caffeine (or theine) and tannic acid which it contains are the things that mainly affect us. We want as much as possible of the former, as little as maybe of the latter for that is harmful. Even poor people can afford tea, for we can get a lot of pleasure out of two ounces costing 1½d.; at least a gallon of liquid refreshment can be brewed from it (double if we are content to have it weak); whilst a gallon will cost exactly the same amount as half a pint of "six-ale."

There are, it is true, certain dangers in the excessive use of tea, and particularly in drinking stewed tea, which should not be disregarded, especially by girls and women, some of whom suffer seriously in health from the habit of drinking tea too often and too strong.

Let us mention a few Do's and Don'ts in regard to tea-drinking:—

1. Heat your tea-pot before making tea: the tea will "draw" the better.

2. Make your tea as soon as the water boils: long boiling makes it flat.

3. Drink your tea within a few minutes of the making if possible.

4. If the water has been boiling for some time hold

the kettle high up as you pour the water into the pot that it may be re-aerated.

On the other hand

1. Don't be a slave to tea, and fancy you can't do without it.

2. Don't drink tea at every meal or all day long.

3. Don't stew tea or put the pot on the stove by the hour to keep it hot, or make it strong.

It is impossible to expect everyone to carry out all the rules of doctors or other wise people. Quite rightly these tell us not to let the hot water remain on the tea-leaves more than five minutes: they advise us to put the tea in a muslin-bag and withdraw it after three minutes or to pour off the tea into a separate hot tea-pot after it has been made a few minutes.

All this advice is excellent, and is given to keep us from drinking too much tannic acid, which is bad for digestion, whilst at the same time we may get all the caffeine possible which is stimulating and refreshing.

We get nearly as much caffeine after tea has been brewing for five minutes as after an hour, whilst we get two or three times the amount of tannic acid by keeping the tea standing for half or three-quarters of an hour.

Tea should not be drunk at a heavy meal or when meat is taken in any quantity.

Tea that has been brewing for an hour or more by the fire is really poisonous. If it has been kept for the late comer the tea ought to have been poured off the leaves into a separate pot without the leaves.

The plan of putting a pinch of bicarbonate of soda has a very useful effect, especially if the water is hard.

COFFEE.

Really good coffee is a rarity in England though we consume tens of thousands of tons yearly. Nine persons out of ten don't know how to make it, which is a pity, though it may be some consolation to reflect that for every pound of coffee used in Great Britain we use about seven pounds of tea. If we drink coffee,

however, we may as well have it good, but in that case it is far more expensive and more difficult to make than tea. To get really good coffee we must have—

1. Berries freshly roasted if possible, certainly freshly ground.

2. Plenty of coffee; $1\frac{1}{2}$ to $2\frac{1}{2}$ ozs. should be used to a pint of water.

3. The vessel in which it is made—earthenware jug or tin pot percolator or steaming machine—must be absolutely clean.

4. The water must be used directly it boils and the vessels in which the coffee is made should be hot.

With some persons tea and coffee do not agree. These drinks keep them awake at night or upset them for some reason. Where this is the case, they must be given up and some other beverage substituted. All should know what suits them best and use the common sense with which Nature furnishes them.

COCOA.

Cocoa and chocolate must be placed on an entirely different footing from tea. They are real foods. Both are produced from the beans of the Cocoa (*Theobroma cacao*). *Theobroma* means in Greek, “food of the gods,” but as we in these practical days attach less importance to the name of an article than what it contains, I may state that about half the contents of the raw cocoa-bean consists of fat, so that cocoa will give plenty of energy to the body. The amount of protein in cocoas and chocolates varies but reaches in some cases 20 per cent. or more, and their fuel value ranges from 2,000 to 3,000 calories per lb.

The best cocoas sold to the public contain a large amount of nourishment and are real body-builders and heat-givers. Even when sugar, starch, or arrowroot is added, as in some cocoas, they are still quite useful foodstuffs.

CHAPTER XVIII.

FRUITS AND NUTS.

IN the past it has been quite customary to regard Fruit and Nuts as luxuries and meat as a necessity. Owing to this mistake our diet has not been as healthful and interesting as it might have been.

Few people have any idea of the amount of protein and energy contained in some of our common fruits and nuts, so I will give a little table showing the value of the edible portion of some of these.

DRIED FRUITS.			Protein per cent.	Calories per lb.
Apples	...	...	$1\frac{6}{10}$	1350
Bananas	...	...	$5\frac{3}{10}$	1240
Currants	...	...	$2\frac{4}{10}$	1495
Dates	...	...	$2\frac{1}{10}$	1615
Figs	...	...	$4\frac{3}{10}$	1475
Prunes	...	...	$2\frac{6}{10}$	1605
Raisins	...	...	$2\frac{6}{10}$	1605

In regard to fresh fruits there is not nearly so large an amount of nutriment as in dried fruits in proportion to weight. The water they contain amounts to 60 per cent. and upwards and is usually 70 to 90 per cent. In the case of the invaluable apple for instance the water in the edible portion amounts to 84 per cent. whilst the protein is .4 per cent., or a two hundred and fiftieth part, and the fuel value per lb. is 290 calories. The banana is composed of 75 per cent. water, $1\frac{7}{10}$ per

cent. protein, and has a value of 460 calories per lb. But fruits possess an importance quite apart from their protein and energy value, as they help to keep the body in good working order. Most fruits are laxative, and the citric, malic, and other acids they contain are most useful. Fresh fruit and green vegetables supply the body too with mineral matter—another helpful feature of their contents.

Here is a table of a few every day nuts with their values (edible portion).

			Protein per cent.	Calories per lb.
Almond	...	...	$21\frac{4}{10}$	2895
Brazil Nut	...	...	$17\frac{4}{10}$	3120
Chestnut (Dry)	...	...	$10\frac{7}{10}$	1840
Cocoanut	...	...	$6\frac{6}{10}$	2805
Filbert	...	...	$16\frac{1}{2}$	3100
Peanut	...	...	$29\frac{8}{10}$	2610
Walnut	...	...	$18\frac{2}{10}$	3075

The refuse, mainly shell, forms a considerable portion of the nut. For instance in chestnuts nearly one quarter is refuse, in peanuts rather over one quarter, in almonds nearly one half.

Nuts are generally rich in mineral matter, especially the Brazil, the walnut, the almond, the chestnut, and the peanut. Even the beechnut contains nearly 22 per cent. of protein and has a fuel value of 2740 calories per lb.

I give a table, by way of comparison, of other foods.

			Protein per cent.	Calories per lb.
Beef Steak (edible portion)			$23\frac{1}{2}$	1300
Potatoes	„		$2\frac{2}{10}$	385
Cheese, Cheddar	„		$27\frac{7}{10}$	2145
Eggs, boiled	...	...	$12\frac{4}{10}$	680
White Bread	...	...	$9\frac{1}{10}$	1215
Cabbage	...	...	$1\frac{6}{10}$	145
Honey	...	...	$1\frac{4}{10}$	1520
Sugar, granulated	...	...	—	1860

CHAPTER XIX.

HOW TO KEEP IN GOOD HEALTH.

It is a well-known fact that many persons get into an unhealthy state by over-eating: especially is this the case when they take little exercise to provide for using up the energy which is produced from the food they eat. Persons of advancing age usually need much less food, especially animal food, than in earlier life. Sometimes this is recognised; and the ills attendant on indigestion are avoided. The example of Horace Fletcher, an American citizen, is well worthy of record. His name has been given to a system known as "Fletcherism."

Some years ago Mr. Fletcher found that life was not worth living. His wealth brought him no pleasure: he was a martyr to indigestion and depression. After a good deal of thought he came to the conclusion that he must adopt a reformed system of diet. He did so, and obtained buoyant health in place of the miserable ill-health from which he had previously suffered.

Briefly stated, the root principle of Fletcherism is this: that if food is thoroughly masticated a much smaller quantity is required to secure physical efficiency than has hitherto been thought necessary.

The idea of thorough mastication is not a new one by any means. Many years ago Mr. W. E. Gladstone adopted it and attached so much importance to the system that he cordially recommended it to others. Mr. Fletcher heard of this statesman's method at a time when he was in ill-health. He had studied the food

question as set forth in many books which he found to contain the most diverse and contradictory views. Having given a trial to Mr. Gladstone's method, he became convinced of its value.

THOROUGH MASTICATION.

First of all Mr. Fletcher proved the value of this system by personal experience. Everyone acknowledges in theory that food should be properly masticated, and few have escaped the pains of indigestion which follow from "bolting" food. Also, it may be said, that few carry out the theory in practice.

Food, contends Mr. Fletcher, should be chewed to a creamy pulp before it is swallowed. Not alone for the increased enjoyment which it thus affords, though that is great, but because when chemically transformed in the mouth by admixture with the saliva which Nature provides, it becomes better fitted for digestion and absorption.

Having proved the efficacy of this treatment personally, Mr. Fletcher next tried to get his system recognised and was at first met with blank disbelief or absolute incredulity.

But he well knew he had got hold of a good thing, so he pegged away. Then as he did not get down-hearted but continued steadily to proclaim the merits of his system, people began to think there might be something in it.

He was asked to read a paper on the subject at the British Association. This attracted some little notice, and scientists in America commenced making investigations.

Scientific men in England, France, Italy, Switzerland, Germany, Belgium, and America gave a good deal of attention to his views. In the latter country thousands of families adopted the principles which he advocated.

Mr. Fletcher proved in the course of experiments to which he submitted himself that he could stand greater tests of endurance at the age of 50, without training, than young athletes could do who were in training.

President Roosevelt, hearing of the system, authorised it to be tried on soldiers, the results being an astonishing confirmation of its value.

On his 50th birthday Mr. Fletcher rode nearly 200 miles on his bicycle without feeling any undue strain.

At the age of 58 he lifted 300 lbs. weight upwards of 350 times with the muscles of his right leg below the knee, whilst the record of athletes up to that time was 175 lifts. This and similar feats of endurance were performed whilst eating but two meals a day, the average cost of the two being 5½d.

Mr. Fletcher, being a man of means, has not adopted the system for the sake of economy, but for the promotion of health. His diet consists mainly of bread, potatoes, beans, milk, cream, butter, and fruit, with eggs and fish occasionally. Once, as an experiment, he lived 17 days on fresh milk only, taking about two quarts a day. But he does not eat any defined quantity of food, eating when hungry and leaving off when Nature is satisfied.

Two meals a day he considers ample, taken morning and evening. The main rules of the system are :

1. Never eat unless you are hungry, a state which is indicated by the mouth "watering."

2. Masticate thoroughly.

3. Leave off eating when the desire for food is satisfied.

4. Get all the taste out of the food, whether it be soup, meat, or anything else, by sipping, biting, or chewing.

5. Stop when enough has been taken ; that is, when the saliva begins to flow less freely and when a diminution in the pleasure of eating is experienced.

Dr. Haig whilst commending Mr. Fletcher's suggestion for thorough mastication remarks, "I see no proof that it has as yet enabled anyone to live on less than the physiological allowance of albumin." Nevertheless we ought to "play the game" with Nature, and if we want to keep in good health, it is certainly advisable that we should **eat slowly and chew thoroughly.**

CHAPTER XX.

ARE YOU A VEGETARIAN ?

Is there any value in vegetarianism, or is it a system for faddists ?

One thing is certain : that anyone who takes up vegetarianism is set down as more or less of a crank by his fellow men. But let him take courage. The teetotaler of half a century ago was an object of jest and ridicule, whilst to-day he is looked upon as rather a far-seeing fellow. It is not at all unlikely that in a few years time the vegetarian may be similarly esteemed.

There are strict and loose vegetarians : one class which excludes all animal products and the other which partakes of butter and cream, cheese and eggs. I am thinking of the latter when I speak of vegetarians.

When we consider the various kinds of food, we ask a few questions about each, such as—

1. Is it good ?
2. Is it cheap ?
3. It is pleasant ?
4. Does it give strength ?
5. Is it a body-builder ?
6. Does it give energy ?
7. Is it easily purchased ?
8. Can it be readily prepared ?
9. Will people eat it ?

A vegetarian diet will answer all these questions in the affirmative with confidence except the last two. At present comparatively few persons will take to it

at all, and then only under the stress of circumstances such as when they can't afford to eat meat, or when they can't get fish, which often happens in the case of the poor; or when the doctor says they would be better without flesh food as sometimes happens in the case of the rich.

It is true some vegetable foods take time to prepare, but let us face the truth why vegetarianism is not popular. The ordinary man—the working man—loves meat and believes in its virtues; he thinks he gets more strength from it than anything else, and that he would suffer if he did not eat any. He abhors, too, a diet without “tastiness,” and revels in flesh foods from the expensive beef-steak to the economical kipper.

IN PRAISE OF THE HARICOT.

But he is under a delusion, just as the man is who, when he leaves prison says he must “feed up”; the fact being that the prisoner is usually in far better condition when he quits one of His Majesty's palaces for erring souls than when he went in.

More than thirty years ago, that clever and reliable Surgeon, Sir Henry Thompson, in his very sane book on “Food and Feeding” remarked: “Haricots are good enough to be welcomed at any table. For our labourer,” he said, “probably the best of the legumes is the haricot bean;” and he advised that they should be thus prepared:—

“Soak a quart of the dried haricots in cold water for about 12 hours, after which place them in a saucepan on the fire with two quarts of cold water and a little salt; when boiling remove the cover and simmer slowly until the beans are tender; the time required being about two to three hours,

“Eaten with pepper and salt, or with the addition of a bit of butter, melted butter and parsley, or as an alternative stewed with an onion,” he considered them a fragrant dish worthy of the consideration of the working-man.

Sir Henry also said respecting beans : “ There is no product of the vegetable kingdom so nutritious ; holding its own in this respect , as it well can, even against the beef and mutton of the animal kingdom. The haricot ranks just above lentils. . . . By most stomachs, too, haricots are more easily digested than meat . . . and consuming weight for weight the eater feels lighter and less oppressed as a rule, after the leguminous dish, while the comparative cost is greatly in favour of the latter.”

A FOOD EXPERT OF TO-DAY.

But, nowadays, we want all our information quite up-to-date, so we will state what a modern physician of the highest repute, and a food expert, says on the subject of vegetarianism :—

“ Taking the results as a whole,” writes Dr. Robert Hutchison in his “ Food and Dietetics,” “ it will be observed that vegetable foods are far cheaper than animal foods, whether one uses them as sources of energy or of building material.”

So evidently there is a great deal to be said for a vegetarian diet. I need say no more as to the saving that can be effected. That will be seen from the charts and particulars printed in this book.

But I venture to offer a word of suggestion. If the long-suffering, hard-working housewife could only find time to study how to make tasty vegetarian dishes, pleasant vegetarian soups and appetising vegetarian fare as the French do, her vegetarianism would meet all the requirements proposed in my questions.

It is no use trying to wean the working man from his flesh-pots in a day ; it would be as reasonable to give a week-old baby a beef-steak. But, it is surely worth while giving as much attention to the bread-winner, as it is to feeding the baby.

The mother weans the baby from its milk-diet to stronger food ; and in course of time she may, by the exercise of the infinite patience of which she is capable,

wean her man, and mankind, from their belief in the superior value of an expensive flesh-diet to one in which vegetable products are more largely consumed.

By adopting this course, in a year's time, at no sacrifice of nutritive value, she might save sufficient to have a respectable balance in those magic brown books issued by the Post Office Savings' Bank, wherein the capital sum deposited grows whilst we sleep.

Dr. Alexander Haig, Physician to the Metropolitan Hospital, points out in his "Diet and Food" that all kinds of discomforts arise because many men and women do not consider the question of diet a matter of primary importance, and attempt "to carry out the diet of youth into middle life and age." He says also that in eating meat, digestion is rapidly stimulated and the food taken is quickly brought into use. The man, therefore, who eats meat feels the effect quicker than one who gets his energy from bread and cheese and similar foods.

But while the latter foods are slower in their action they are more enduring and to show this some very remarkable information is given.

Thus in a 125 miles' walking match from Dresden to Berlin, held in 1902, eighteen vegetarians and fourteen meat-eaters took part. Six vegetarians covered the distance in advance of any of the meat-eaters, whilst the winner, Karl Mann, was seven hours ahead of the first meat-eater. Ten of the vegetarians lasted out the whole distance, but only three flesh-eaters.

On another occasion fourteen meat-eaters and eight vegetarians took part in a walking-match, the distance being seventy miles, with the following result. Every one of the vegetarians got home in advance of the meat-eaters, they were all in good condition when they had covered the distance, and the winner's time was only 14 $\frac{1}{4}$ hours. As to the meat-eaters the first came in very exhausted, an hour after the last vegetarian; all the others gave up before the distance had been covered.

CHAPTER XXI.

PEOPLE WHO BELIEVE IN SIMPLE LIVING.

Simple living it has been said, is the root of all virtues. Let us therefore devote this chapter to telling the story of some men who have tried it.

The late Prof. Mayor, of Cambridge, the famous Latin scholar, was of opinion that the belief in the necessity of constant food for physical and mental energy was nothing but a modern superstition. He was quite convinced that fasting would cure many diseases, and he was able to speak from practical experience of the beneficial results derived from it.

SEMI-FASTING.

Some years ago he was at work on a task which meant the looking out of many thousands of Greek and Latin passages. He calculated that he would be engaged for about forty-eight days, and decided to adopt the following method of living during that period. (1), For the first 12 days he was to fast every other day ; (2), for the second 12 days he was to fast every third day ; (3) for the third 12 days he was to fast every fourth day ; (4) for the fourth 12 days he was to fast every sixth day.

Thus he intended to fast—

1. During the first 12 days—6 days.
 2. During the second 12 days—4 days.
 3. During the third 12 days—3 days.
 4. During the fourth 12 days—2 days.
- 15 days in all.

At the end of 19 days he had fasted 8 days, which was more than half the number of days he had intended to fast altogether. He then found he had lost 13 lb. weight and by his doctor's advice, discontinued fasting. It should be remarked that fasting in Professor Mayor's

case meant abstaining absolutely from all food, and drinking nothing but water. I say this, because many people speak of fasting when they allow themselves a slight repast in the early morning and late in the evening. His dinners at the time of experiment consisted of dandelion salad and boiled nettles.

Notwithstanding this, he never felt better or more eager for work in his life. Before, during, and after the experiment, he was in robust health. Such hardness did him no harm but very much the reverse.

In regard to living on threepence a day, Professor Mayor in the course of a long letter to me on the subject written in 1910, says: "Of course nothing must be drunk but water. I saw to-day the expenditure of a very poor family: it included 1d. for tea, 1d. for sugar. Both of these are very unnecessary luxuries."

He mentions an undergraduate, who lived for 3d. a day, "whose daily 'stint' was a 2d. loaf (he would have got much more for his twopence if he had bought grain, ground it himself, and made porridge of it), a farthingsworth of vegetables, and three-farthingsworth of fruit."

He also speaks of a lady who was once editor of the "Vegetarian Messenger," and was educated at Girton College. "Her fellow-students envied her library. 'How rich you must be,' said they. 'In fact, she was the poorest of all, but had lived for years, and recovered health, on 3d. a day for food.'"

"Some years ago," continues the Professor, "the Rev. C. H. Collyns once said on the platform that neither he, nor anyone in his house, spent more than 6d. a day for food. The Manchester papers doubted the fact; there was a large correspondence. At last, one wrote who lived for a 1d. a day. He bought corn, good and nutritious, but not attractive looking, for about half-price; and on that he lived."

"To-day," says the Professor, "I saw in the *Daily Mail* that on a given plot you could grow of potatoes about 40 times the amount (in weight) that you could of

a far greater weight than of potatoes.
No doubt Great Britain need not
import any corn, if we ceased to eat
flesh, and cultivated the land as the
Chinese do

So long as we spend enormous sums
in poisoning ourselves with tobacco
and alcohol, we can do little towards
national recovery. Tobacco is far more
used in the university now than
it was ^{sixty} ~~forty~~ or ^{twenty} ~~fifty~~ years ago; and
I see no prospect of reform.

Vegetarians are nearly all teetotallers;
but some, in order to have some habit
in common with the carnivorous,
condescend to smoke with them. Still,
I hope that very few of us give way
so far.

Very truly yours

John E B Mayor

My dinner during the experiment, consisted
of dandelion salad and boiled nettles.

I was in rude health before, during and
after the month. I am now 85 ^{1/2} years
old and work very hard

Facsimile of portion of a letter written to the author by
Prof. Mayor in 1910 when he was over 85 years old.

corn, and of bananas a far greater weight than of potatoes. No doubt Great Britain need not import any corn, if we ceased to eat flesh, and cultivated the land as the Chinese do."

A CHAMPION'S VIEWS.

Mr. Eustace Miles, M.A., who has several times won the Amateur Tennis Championship of the world, and has been the holder of the Gold Prize for many years, who has been amateur champion of America at tennis and racquets, and has otherwise distinguished himself as an athlete, is a food reformer and a very sparing eater. He has given years of study to the science of food and feeding, and is one of the leading authorities. He reformed his system of feeding in the year 1894. Before he gave up flesh foods he felt that life was not worth living ; since he has fed on scientific principles he wants to live to be a hundred or more, as life has become more pleasant and happy.

Athletic authorities, Mr. Miles tells us, insist that when a man goes in for physical training he must sacrifice brain work and must exercise nearly every day. But owing to his present method of living he has found this is quite unnecessary.

During the time he has been a vegetarian he has seldom felt tired. In America, on several occasions, he played three hard matches in succession, and in one day exhausted two or three opponents. At Boston the players tried to tire him out and kept him at play all day long until dark, but they failed, though he played with all his strength. Tennis, in which Mr. Miles excels, is a game requiring great exertion, and brain work as well as body work. In a match he played with Sir Edward Grey he lost seven pounds in weight.

Mr. Miles has stated that there has seldom been a day when he was not prepared to play tennis, amid all his intellectual work. He has produced a large number of booke on diet and physical education.

His efforts on special occasions have been marvellous.

One day he dictated 30,000 words to a stenographer and his brain-work has even improved at times of the most severe physical training.

What, then, is Mr. Miles' favourite system of living ?

1. No solid food whatever till mid-day.
2. Well-balanced non-flesh foods only.
3. Not more than two meals a day.

Nowadays he eats a little more than he did formerly so as to have a safety margin.

He requires little or no exercise to keep him in condition and sums up his system of dieting under the acrostical form of the word MAGNVS :—

Milk and its products, e.g., cheese and his own proteid food (which contains some dried milks).

Apples as representing fruits.

Grains and grain products ; fine wholemeal bread, gluten, rice, macaroni.

Nuts and nut-products.

Vegetables.

Salads.

TOLSTOY ON FASTING AND FLESH EATING.

Tolstoy, in his remarkable essay, "The First Step," says "Fasting is an indispensable condition of a good life. When Christianity replaced heathenism it put forth moral demands superior to the heathen ones and at the same time (as was also the case with heathen morality) it necessarily laid down one indispensable order for the attainment of virtues . . . Plato's virtues, beginning with self-control, advanced through courage and wisdom to justice : the Christian virtues, commencing with self-renunciation, rise, through devotion to the will of God ; to love."

The butchering of animals was abhorrent to Tolstoy. He held that man is not a carnivorous animal by nature, and that flesh-food is unnecessary and only serves "to develop animal feelings, to excite desire, and to promote fornication and drunkenness." And, he adds, that this is continually being confirmed by the fact

that young, kind, undepraved people—especially women and girls—without knowing how it logically follows, feel that virtue is incompatible with beef-steaks, and, as soon as they wish to be good, give up eating flesh.” Tolstoy did not suggest that all people should cease to eat meat, but that in order to live useful and noble lives a certain order of good actions was indispensable; that in this sequence self-control and self-restraint must find a place, and that this self-control would manifest itself in the resolution to abstain from animal food.

EXTRAVAGANT BUT HEALTHY.

Here is the weekly budget of a man living on less than 6d. a day. He is a rich man, well advanced in years, who has striven to lead a healthy life, eat what Nature required, and keep active and vigorous in mind and body:—

	s.	d.
Brown bread—6 loaves at $1\frac{1}{4}$ d. each	0	$7\frac{1}{2}$
Oatmeal, 1 lb.	0	2
Eggs	0	5
Jam and Marmalade	0	5
Butter (a quarter of a lb. a fortnight)... ..	0	$1\frac{1}{2}$
Sugar	0	1
Milk	0	$3\frac{1}{2}$
Tea	0	$3\frac{1}{2}$
Sunday dinner (including stewed onions, or celery, or roasted tomatoes)	0	5
Broken Biscuits	0	3

Total 3 1

Breakfast is taken at 8 o'clock, consisting of brown bread and marmalade and two cups of tea with sugar and milk, followed by a plate of oatmeal porridge.

At 1.30 p.m., brown bread and jam, with two cups of tea, sugar and milk and egg boiled hard.

At about 7 p.m., a tumbler of hot water and about a quarter-of-a-pound of broken biscuits.

“Thus,” said this believer in simple living, “I go on from week to week, without desiring a change and finding in this system all the sustenance I desire.”

CHAPTER XXII

STANDARDS OF LIVING.

WHAT IS POVERTY ?

Poverty, according to the dictionary, is the state of being poor, needy or destitute of property ; need, want or scarcity of means of existence.

Let it be said at the outset that deplorable as a state of want is many poor people make a splendid fight against poverty and meet hardship and privation with resolution and patience. Such persons have brought up families on means which seem to the social reformer utterly inadequate.

As an offset to their hard lives they have gained in several ways. They have shown grit and independence by abstaining from parish relief in bad times. Their self-denial has strengthened their character and been an example to those around them ; their children have benefitted by the object-lessons they have had of sobriety and thrift. The strife has produced a certain nobility which is not the less commendable because the fight against needy circumstances is likely to make lives mean and narrow and squalid.

When, in "Paradise Regained," Satan points out that
 "Virtue, valour, wisdom, sit in want,"
 the Son of Man replies :—

"Yet wealth without these three is impotent
 To gain dominion, or to keep it gained
 Witness those ancient empires of the earth,
 In height of all their glowing wealth dissolved
 But men endued with these have oft attained
 In lowest poverty to highest deeds.

In determining what poverty really is and how it is caused several things have to be taken into consideration, including :—

1. The character of the husband and wife.
2. The wages earned by the bread-winners.
3. How the income is expended.
4. The number of children in the family.

The most potent factor of all in determining the well-being of the family is, perhaps, the first-named.

The single man without the responsibility of a family, who is strong and healthy, may be dismissed from our thoughts. If he is in poverty he deserves it.

To consider this subject the better it may be well to give a short summary of the views of Mr. Seebohm Rowntree whose work, "Poverty: a Study of Town Life," which represents an immense amount of labour and thought, is based on a study of the city of York.

In the year 1899 Mr. Rowntree, with able assistance, obtained particulars of the condition of over 11,000 families, representing a population of more than 46,000 persons. His report deals with practically the whole of the wage-earning classes and is concerned with nearly two-thirds of the dwellers in the city, the total population of York at that date being about 75,000.

ABOVE AND BELOW THE POVERTY LINE.

Mr. Rowntree divides the wage-earning classes into the following divisions :—1. Families earning less than 18s. a week ; 2. Families earning 18s. and less than 21s. ; 3. Families earning 21s. and less than 30s. ; 4. Families earning over 30s.

Class 1 contained about 42 per 1,000 of the wage-earning population ; class 2 contained 96 per 1,000 ; class 3 contained 336 per 1,000 ; class 4 contained 526 per 1,000.

He separates these into various groups :—

1. Families in primary poverty.
2. Families in secondary poverty.
3. Families above the poverty line.

He fixes the “poverty line” of the wage-earning classes by calculating (a) the cost of the minimum amount of food necessary for the proper nutrition of each man, woman and child to preserve the body and mind in a state of efficiency; and (b) the minimum amount necessary for the provision of housing accommodation, fuel, clothes, and incidental expenses. If the income of the family is not sufficient to provide these he regards that family as in a state of poverty.

In regard to food requirements Mr. Rowntree takes the standard adopted by certain scientific authorities in England and America. He gives careful consideration to the Report issued by the Committee appointed to inquire into the subject in 1887 by the President of the Local Government Board upon which the scale of diet in workhouses was fixed. This came into use in the year 1901, and is in operation to-day. But he states specifically that the standard he has adopted is less generous than that which would be required by the Local Government Board.

The conclusion at which he arrives is that the minimum average cost of food—

For a man should be fixed at	...	3/3	per week
For a woman at	... ..	2/9	„
For a child of 8 to 16	... ..	2/7	„
For a child of 3 to 8	... ..	2/1	„
For a child under 3	... ..	2/1	„

(The average for the three latter being 2/3 per week).

On this basis it is easy to reckon what allowance should be made for expenditure on food in various families. Thus, the provision necessary under this scale for—

A man, wife, and 2 children would be	10/6	per week
A man, wife, and 3 children	... 12/9	„
A man, wife, and 4 children	... 15/-	„

and so on.

This minimum is fixed on the assumption that the money is spent to the best advantage on the most nutritious food.

Mr. Rowntree found great difficulty in fixing an average for rent; he gives instead the cost of rent per room in York which was $1/7$ for one, $2/6$ for two, $3/6$ for three, $4/7\frac{1}{2}$ for four, and $5/9$ for five rooms.

The minimum cost of clothing he fixed at :—

Man or woman, 26/- a year, or 6d. a week.

Children : Child of 12, 27/- ; child of 2, 17/- ; average of 22/- a year, or 5d. a week.

Fuel was fixed at $1/10$ a week per family, and sundries at 2d. per head, a week.

These estimates were based on the results of a vast number of inquiries.

Those families, whose income fell below this scale were regarded as living in a state of "Primary Poverty," and out of the 46,754 persons included in the author's statistics over 7,230 or more than 15 in every 100 were found to be living in such a state. Those families were regarded as living in a state of "Secondary Poverty" whose income was sufficient to provide for their requirements on the above scale, but where a portion was spent on drink, gambling, or otherwise wasted. There were 13,072 persons in this condition, or about 28 in every 100. Those above the poverty line numbered 26,452 or about 56 per 100.

According to Mr. Rowntree's estimate over one quarter of the inhabitants of the city of York were living in a state of poverty, and to show how much the poor were affected by the conditions in which they lived he mentions the death-rate per thousand persons was in the case of the poorest classes about 28 per 1,000, of the middle working class about 21 per 1,000, of the highest working classes $13\frac{1}{2}$ per 1,000, and for the whole of York 18 per 1,000.

The physical condition of the children was also very much in favour of the better paid working classes, the conclusion being that those children brought up in a state of poverty were on the average not nearly as healthy as were those whose parents earned a better wage.

CHAPTER XXIII.

FAMILY BUDGETS IN TOWN AND COUNTRY.

AND WHAT MAY BE LEARNT FROM THEM.

PART I.

Having spoken of standards of living, let us now see what is actually happening in the cottage homes of Britain in town and country : how the elders are fed and the children are nourished : how thrift and good management help the needy, and carelessness and evil habits drag down those who are ever so much better off.

Many of the labouring classes have, I fear, less idea of what protein is than they have of what is happening on the surface of Mars, whilst in regard to the science of cookery and the art of making food appetising a vast number have never learnt the A.B.C. of the former, and take no trouble to secure the latter.

As to Domestic Economy the majority of people don't understand the term, or the subject, and many "don't want to."

That was the attitude of the country women in a case that came under my notice, when efforts were made to teach them the scientific principles of cookery. They went with reluctance to the lectures, they came away unconvinced, they were highly critical, they thought they knew better how to do things than the teacher. There was something to be said on their side. The teacher, probably, did not sufficiently appreciate the rural mind and the rural requirements.

So that to effect a reformation we must catch the girls when young, and give them a good grounding in Domestic

Economy. Recently I heard of a remarkable case of thrift in a Gloucestershire village. A man whose wage averaged about ten shillings a week brought up a small family and saved sufficient to buy his cottage. On inquiry of the Vicar of the parish, he informed me that my information was substantially correct and added that if girls were fully taught the principles of domestic economy at school he saw no reason why this should be an exceptional instance. The low rent of the cottage, the large garden, the allotment, abstinence from drink and absolute thrift helped to produce this striking result.

Thanks to the records made by Mr. Rowntree, Miss Davies, and others, we know what people actually eat week by week, how the effect of thrift and management is shown, how the household is fed. We can see from their statements, collected with great care and persevering industry, that the prosperity of the working-classes does not depend on wages alone.

From Mr. Rowntree's valuable book on Poverty I give the weekly budget of two families. The first is that of a labourer, the family consisting of father, mother, and five children, where the total income is 17/6 a week. For such a family, according to the author's standard of living the following weekly provision is necessary to ensure physical efficiency :—

	s.	d.
Food for 2 adults at 3/- each 	6	0
Food for 2 children (aged 11 and 9) at 2/7 each ...	5	2
Food for 3 children (aged 7, 4, and 2) at 2/1 each	6	3
Rent of 3 rooms, say 	4	6
Fuel 	1	10
Clothes for 2 adults at 6d. each ; and for 5		
children at 5d. each 	3	1
Sundries for 7 persons at 2d. each	1	2
	<hr/>	
	1	8 0

The actual income fell short by 10/6 of the proper standard. How, then, was the family provided for? The father was an intelligent man, but his health had

been affected by a long illness ; the mother was bright, capable, and a good manager, who baked her own bread. The eldest boy was deformed and weakly. The children bore some signs of privation. The family received gifts of old clothes which were turned to the best account by the woman ; the father repaired the boots. He was not a teetotaller by conviction, but denied himself beer as he could not afford it. He smoked and bought a weekly paper. As to meals, on Sunday meat was provided. What was left over was usually given to the man who took his dinner with him daily to his work.

Here is the full bill of fare for the week :—

SUNDAY.

BREAKFAST.—Bacon, bread, tea.

DINNER.—Potato-pie, potatoes, cabbage.

TEA.—Bread, butter, currant cake, tea.

MONDAY.

BREAKFAST.—Porridge, bread, butter, tea.

DINNER.—Potato pie.

TEA.—Bread, butter, currant-cake, tea.

TUESDAY.

BREAKFAST.—Brown and white bread, butter, tea.

DINNER.—Meat, bread, tea.

TEA.—Bread, butter, dripping, tea.

WEDNESDAY.

BREAKFAST.—Brown and white bread, butter, tea.

DINNER.—Bread, bacon, tea.

TEA.—Bread, butter, dripping, tea.

THURSDAY.

BREAKFAST.—Porridge, bread, butter, tea.

DINNER.—Bacon, bread, bread-pudding, tea.

TEA.—Bread, butter, lettuce, tea.

FRIDAY.

BREAKFAST.—Brown and white bread, butter, tea.

DINNER.—Fish, bread, tea.

TEA.—Bread, butter, onions, tea.

SATURDAY.

BREAKFAST.—Bacon, bread, tea.

DINNER.—Eggs, bread, butter, tea.

TEA.—Bread, dripping, onions, tea.

The diet varied during the time under review. Sometimes the food supplied was on a rather more liberal scale, bacon being given at breakfast every morning, soup, fish, or cake in turn at tea and meat occasionally for dinner. In cold weather the children often had pea-soup for dinner. When any special expenditure was necessary for the house the food of the family was reduced in quality.

Another budget is given by Mr. Rowntree where the family consisted of three: father, mother, and one child, and the income was 18/- a week. But they were bad managers, untidy, careless, and often in debt, and the food was not so nourishing or useful as in the case just mentioned where a much larger family was kept on less money. Here is the bill of fare for one week to compare with the other:—

- Su.—BREAKFAST.—Bacon, bread, toast, tea.
 DINNER.—Meat, potatoes, Yorkshire pudding.
 TEA.—Bread pie, tea cakes, tea.
- M.—BREAKFAST.—Bacon, bread, tea.
 DINNER.—Bacon, bread, tea.
 TEA.—Bacon, bread, tea.
- Tu.—BREAKFAST.—Bread, meat, tea.
 DINNER.—Meat, bread, tea.
 TEA.—Meat, bread, tea.
- W.—BREAKFAST.—Bacon, bread, tea.
 DINNER.—Meat, bread, tea.
 TEA.—Eggs, bread, “dip,” tea.
- Th.—BREAKFAST.—Bread, butter, tea.
 DINNER.—Meat, bread, “dip,” tea.
 TEA.—Meat, bread, butter, tea.
- Fr.—BREAKFAST.—Bread, cheese, tea.
 DINNER.—Potatoes, bread, tea.
 TEA.—Bread, butter, tea.
- Sa.—BREAKFAST.—“Dip,” bread, butter, tea.
 DINNER.—Sausages, bread.
 TEA.—Bread, cocoa, jam, tea.

CHAPTER XXIV.

FAMILY BUDGETS IN TOWN AND COUNTRY.

PART II.

Having glanced at two town budgets we will turn to the country and see how the conditions differ there.

In doing this we are assisted by Miss Maud Davies, who, in a valuable book entitled, "Life in an English Village," describes the social condition of the inhabitants of the parish of Corsley, in Wilts. She has adopted Mr. Rowntree's standard in regard to the income necessary to provide physical efficiency and to keep a family from primary poverty, with these modifications.

1. She has estimated fuel at 1/- a week per household as facilities exist for picking up firewood.

2. No allowance is made for rent because some of the cottagers live rent free, and in other cases the land attached to the houses of the labouring-classes (on which vegetables can be produced) is regarded as being equal in value to the rent of a house in the town.

To show what can be accomplished by industry in the garden, Miss Davies mentions a case where a woman made over £8 in a year from the sale of garden produce and poultry, besides what was consumed in the house. Strawberries, raspberries, and apples accounted for more than £4 and poultry 25/-. The rent of the five-roomed house was £5 5s. a year, and the garden contained not quite one-third of an acre.

She gives the following figures in regard to the population of that parish:—

28 families containing 144 persons living in primary poverty.

37 families containing 128 persons living in secondary poverty.

155 families on the sunny side of the poverty line.

There were according to these statistics,

13 out of every 100 families in primary poverty.

17 out of every 100 families in secondary poverty.

70 out of every 100 families above the poverty line.

Miss Davies, like Mr. Rowntree, gives many family budgets.

Appended is a specimen of the dietary of a household living below the poverty line, selected from her work. The family consisted of a labourer, his wife and six children. Their income was 16/6 a week. Adopting Miss Davies' scale the family should receive 21/10 a week to raise it above a state of primary poverty, thus :—

					s.	d.
Food for man and wife	...	...	...	...	6	0
Food for 6 children at 2/3	...	...	...	...	13	6
Fuel	...	...	...	...	1	0
Sundries at 2d. each	...	...	...	...	1	4
						<hr/>
						£1 1 10

No provision is made for clothes, but 8½d. a week was paid into a clothing-club and probably the family received gifts of garments. The man, moreover, received £3 at Christmas, also an occasional rabbit and some firewood.

GOOD MANAGEMENT.

The mother being a good manager and the father an excellent man who gave all he earned to his wife, and drank no beer, the family fared better than many others who, although having a larger income, spent a portion of their income wastefully.

Here is a week's dietary fare provided for this family :

SUNDAY.

BREAKFAST.—Bread, fresh butter, tea, bread and milk.

DINNER.—Potatoes, pork, vegetables, currant pudding.

TEA.—Bread and butter, jam, tea.

MONDAY.

BREAKFAST.—Toasted bread and butter.

DINNER.—Bread and milk, cold pork, tea.

TEA.—Boiled potatoes, bacon, cocoa, milk.

TUESDAY.

BREAKFAST.—Bacon, tea, bread and milk.

DINNER.—Bread and cheese, cocoa.

TEA.—Fried bacon, potatoes, tea.

WEDNESDAY.

BREAKFAST.—Toasted bread and butter, tea, milk.

DINNER.—Bacon, boiled potatoes, cocoa.

TEA.—Bread and butter, jam, bread and milk.

THURSDAY.

BREAKFAST.—Bread and fried bacon, dripping, tea, bread and milk.

DINNER.—Boiled potatoes, bacon, suet-pudding, cocoa.

TEA.—Bread and butter, and jam, bread and milk, tea.

FRIDAY.

BREAKFAST.—Bread and salt butter, toast, tea.

DINNER.—Cheese, cold pork, cocoa.

TEA.—Boiled potatoes, fried bacon, tea, bread and milk.

SATURDAY.

BREAKFAST.—Bread and fried bacon.

DINNER.—Boiled bacon, potatoes, suet-dumpling, onions, cocoa.

TEA.—Bread and butter, bread and dripping, tea.

SUPPER.

SUNDAY.—Bread and cheese, cocoa, bread and milk.

SATURDAY.—Bread and fish, cocoa, sugar, milk.

The value of good management, thrift and self-denial is clearly shown from this statement.

Budgets, like statistics, must be carefully considered if we want to arrive at the actual truth.

Many people, for instance, would be apt to say there is not much indication of the families mentioned being below the poverty line judging from the budgets quoted.

But though these budgets show the articles placed on the table they do not necessarily indicate that there was always an abundant supply of food.

CHAPTER XXV.

SUITABLE FOOD FOR A WORKING-CLASS HOUSEHOLD.

IN previous chapters I have spoken of how to live on threepence a day. The majority of the working-classes are happily above the poverty line, and can afford better fare. For such the York Health and Housing Reform Association has made a useful contribution towards solving the problem of how a working-class family, can be fed to the best advantage.

Accepting the standard adopted by Mr. Seebohm Rowntree in regard to the amount of food necessary to secure physical efficiency, the Association has issued a pamphlet under the title of "How to feed a Family of Five on 12/9 a Week." That allows for cost of food at the rate of 3/- each for the father and mother, and an average of 2/3 each for the three children.

The plan does not seek to suggest the cheapest possible foods, but those which the average family will more readily adopt than a vegetarian diet.

The Association has kindly given me permission to reproduce their suggestions and Food Charts, and I have made a selection which I think will be of interest.

As in the case of similar illustrations I have only been able to reproduce the diagrams in one colour on a small scale, but the pamphlet referred to above with its pictures in colour, and another entitled "How to Spend a Shilling on Food to the best Advantage," can be obtained for 1d. each (or post free, 1½d. each),

from the Association mentioned, on application to the Secretary, 6, Blake Street, York.

In a letter received from the Secretary of the Association in regard to these charts he says, "We have had several suggestions for their improvement, but these only effected small details, and I believe, my Committee still feels very strongly that any Food Charts to be widely disseminated amongst the working classes for their education should make some allowance for their preferences as we know them."

From the Notes given in the pamphlets extracts are produced below :—

VEGETABLE FOODS.

DRIED PEAS top the list for protein. Peas or lentils, if properly cooked, and served up as soup, form a valuable food. Peas, beans and lentils have been called "the poor man's meat."

FLOUR. This must be ranked as the most valuable of all our foods. "Seconds" flour, although poor in colour, is richest in protein.

OATMEAL. This is a very rich food—rich in protein and fat as well as in starch. But it requires very thorough boiling to soften the fibre and make it digestible.

POTATOES. One shilling's worth of potatoes, although so bulky, is not nearly so valuable as one shilling's worth of flour or oatmeal.

CABBAGE. Nine-tenths of its weight is water. In cooking, it takes up more water and loses a third of its valuable food contents. Greens and fruit contain valuable salts which keep the blood in good condition, and so they are by no means to be despised. Onions, beet and carrots are more nutritious than greens.

JAM. Sugar is the chief foodstuff in jam, and it is present in a very appetising and digestible form.

SUGAR. There is no waste about this, but if you replace it by treacle, remember that a quarter of the weight of the treacle is water, so that, although treacle

may be more appetising, it is not really such a cheap food as sugar.

ANIMAL FOODS.

To get enough protein for our daily use by living entirely on vegetable diet, means eating a great bulk of food and throwing a lot of work on to the digestive apparatus. With plenty of out-of-door exercise it can be managed, but for most people a mixed diet is the best. On the other hand, to live very largely on an animal diet is costly and has other disadvantages.

ONE SHILLING'S WORTH—CHARTS.

EXPLANATORY NOTES.

1. The size of the targets shows the comparative weight of each kind of food that can be bought for a shilling. Thus the weight of potatoes or cabbages a shilling buys is much greater than in the case of peas or flour, though the latter are far more economical. In purchasing it is necessary to consider quality as well as bulk.

2. The "bull's eyes" show the comparative quantity of protein; the space with perpendicular lines, the fat; the space with horizontal lines the carbohydrates (sugar and starch) and the dotted space the waste matter (water, &c.), in the various articles.

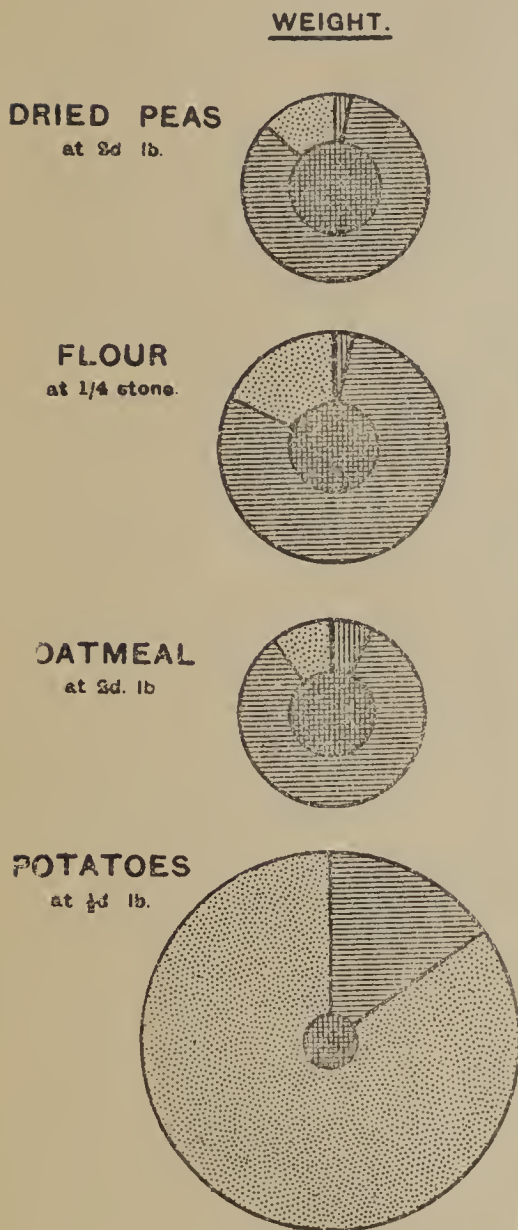
3. The solid black squares show the comparative energy (or fuel) value of each shilling's worth.

HERRING. During the season, fresh herring gives a cheap and abundant source of protein. Herrings, whether fresh, salt or smoked, are both economical and nourishing.

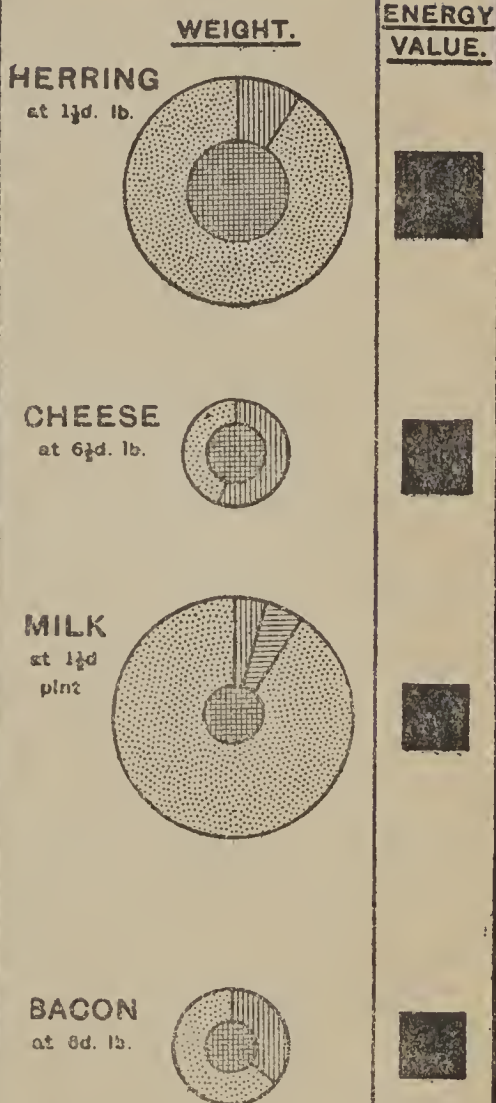
CHEESE. Cheese is one of the cheapest and best sources of animal protein. If you find cheese indigestible try eating it more slowly, or grating it on your potatoes or vegetables, or else make cheese puddings or macaroni

ONE SHILLING'S WORTH

VEGETABLE FOODS.



ANIMAL FOODS.



Protein.



Fat.



Sugar
and Starch.



Waste.



Energy
Value.

Reproduced from a chart in colours issued by the York Health and Housing
Reform Association

cheese. A pound of American cheese, costing 6d., contains almost as much nourishment as two pounds of the best beefsteak costing 1/- lb.

MILK is an extremely valuable food. Skim milk is a cheap source of protein, and is excellent for making soups or puddings, but skimming off the cream has halved its energy value. This, can, however, be replaced by taking dripping along with it.

ALL MEATS ARE DEAR FOODS, although the leaner meats contain up to a quarter of their weight of protein. Meat that is highly roasted, or "well done," is not so easily digested as "under-done" or boiled meat. It is a great mistake to think that you cannot do hard work without meat. People with small incomes should spend little money on meat, and buy more cheese, peas, beans, bread, and cheap fish.

SUET AND DRIPPING are valuable sources of fat.

BUTTER is rather a costly food. Apart from its appetising flavour it has no advantage over margarine, which is a wholesome and excellent foodstuff.

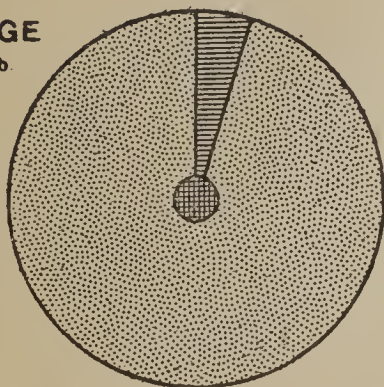
ALCOHOLIC BEVERAGES. In the "targets" for beer and whiskey the striped space represents alcohol (the lighter striped space in the beer target represents carbohydrate). It will be seen that whiskey contains no true foodstuff and that beer contains very little. 1-lb. of bread costing 1½d. contains as much nourishment as 2 gallons of beer costing over 2/-. It is now ascertained that alcohol, although consumed in the body, causes, by dilation of the surface blood vessels, a loss of heat which largely counter-balances its energy-value. The black squares attached to beer and whiskey make no allowance for this, but show their gross energy value. Alcohol is, correctly speaking, a narcotic poison, the use of which, even in the case of the milder drinks—especially apart from meals—is attended with injurious results. It is a mistake to think that stimulants are necessary for those doing hard work.

ONE SHILLING'S WORTH

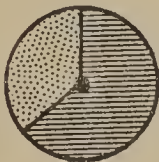
VEGETABLE FOODS.

WEIGHT.

CABBAGE
at 4d. lb.



JAM
at 3d. lb.



SUGAR
at 2d. lb.



ALCOHOLIC BEVERAGES

(Inserted for comparison).

BEER
at 3d. pint.



WHISKEY
at 1 1/2d. fluid oz.



Protein.



Fat.



Sugar
and Starch.



Waste.



Energy
Value.

ENERGY
VALUE.



ANIMAL FOODS.

WEIGHT.

BEEF
at 6 1/2d. lb.



MUTTON
at 6 1/2d. lb.



SUET
at 8d. lb.



BUTTER
at 1/- lb.



ENERGY
VALUE.



Reproduced from a Chart in Colours issued by the York Health and Housing Reform Association

The pamphlet, "How to Feed a family on 12/9 a Week" contains particulars of the best foods to buy and shows that the following articles of food might be purchased for 12/9.

	s.	d.
2 $\frac{1}{4}$ lbs. oatmeal at 2d. lb.	0	4 $\frac{1}{2}$
16 $\frac{1}{4}$ lbs. Flour at 1/5 stone	1	8
5 lbs. Wheaten Flour at 1/6 stone	0	6 $\frac{1}{2}$
1 $\frac{1}{2}$ lbs. Treacle at 2d. lb.	0	3
6 ozs. Jam at 4d. lb.	0	1 $\frac{1}{2}$
3 lbs. Sugar at 2d. lb.	0	6
12 $\frac{1}{2}$ lbs. Potatoes at 7d. per stone	0	6 $\frac{1}{4}$
2 Turnips and 4 Carrots	0	2
$\frac{1}{2}$ lb. Barley, 1 $\frac{1}{2}$ d. ; $\frac{1}{4}$ lb. Rice, $\frac{1}{2}$ d.	0	2
12 ozs. Lentils	0	2
1 lb. Green Peas	0	2
3 $\frac{1}{4}$ lbs. Onions at 1d.	0	3 $\frac{1}{4}$
$\frac{1}{4}$ lb. Figs at 3d.	0	0 $\frac{3}{4}$
$\frac{1}{2}$ lb. Currants at 3d.	0	1 $\frac{1}{2}$
8 ozs. Tea at 1/3 lb.	0	7 $\frac{1}{2}$
ozs. Cocoa Essence at 10d. lb.	0	3 $\frac{3}{4}$
lbs. Meat—Liver, 5d. ; Shin of Beef, 6d. ; Breast of Mutton, 4 $\frac{1}{2}$ d. ; Scrag end of Mutton, 6d. ; Scrap Beef, 4 $\frac{1}{2}$ d.	2	2
1 lb. Tripe at 6d. lb.	0	6
$\frac{1}{2}$ lb. Bacon at 7d.	0	3 $\frac{1}{2}$
$\frac{1}{2}$ lb. Cheese at 6d.	0	3
8 quarts Skim Milk at 1 $\frac{1}{2}$ d.	1	0
11 Herrings at 1 $\frac{1}{2}$ d. pair	0	8 $\frac{1}{2}$
3 lbs. Dripping at 5d.	1	3
Sundries—Baking Powder, Ginger, Herbs, Yeast, Salt, Pepper, etc.	0	4 $\frac{1}{2}$
Bones	0	2
Total	12	9

From this a daily budget for a week could be prepared, such as is found on the next page.

MONDAY.

BREAKFAST.—Porridge and treacle, Tea, Bread and Dripping, Herrings (3).

DINNER.—Barley Broth, Boiled Meat, and Potatoes.

TEA.—Tea, Bread, Jam.

SUPPER.—Brown Bread, Dripping, Cheese, Cocoa, and Milk.

TUESDAY.

BREAKFAST.—Porridge and Milk, Tea, Bread, Dripping (or Fried Bread).

DINNER.—Broth re-heated with Dumplings and Bread.

TEA.—Tea, Brown Bread and Treacle.

SUPPER.—Cocoa, Bread, Dripping, Cheese.

WEDNESDAY.

BREAKFAST.—Tea, Bread, Dripping, Porridge, and Treacle.

DINNER.—Stewed Liver, Green Peas (Marrowfats), Mashed Potatoes.

TEA.—Tea, Currant Bread.

SUPPER.—Cocoa, Milk, Bread, Dripping, Grilled Herrings (2).

THURSDAY.

BREAKFAST.—Porridge and Treacle, Tea, Bread, and Dripping (or Fried Bread).

DINNER.—Irish Stew, Rice and Currant Pudding (for children).

TEA.—Tea, Brown Bread, Treacle.

SUPPER.—Bread, Dripping, Cheese, Cocoa (half Milk).

FRIDAY.

BREAKFAST.—Tea, Bread, Dripping, Herrings or Kippers (3).

DINNER.—Lentil Soup, Fig Pudding.

TEA.—Tea, Currant Bread.

SUPPER.—Cocoa, Brown Bread, Stewed Tripe and Onions.

SATURDAY.

BREAKFAST.—Tea, Bread, Dripping, Fried or Baked Herrings (3).

DINNER.—Boiled Meat Pudding, Potatoes.

TEA.—Tea, Bread, Jam.

SUPPER.—Cocoa, Brown Bread, Baked Onions.

SUNDAY.

BREAKFAST.—Tea, Bacon, Bread and Dripping (or Fried Bread).

DINNER.—Stewed Breast of Mutton, with Savoury Balls, Potatoes.

TEA.—Tea, Toasted Teacakes and Dripping.

SUPPER.—Hot Milk, Bread, Dripping, Cheese.

CHAPTER XXVI.

LIVING ON 4d. A DAY.

“ It’s all very well for you to allow yourself 3d. a day for your food and save money out of it, but you won’t get anyone else to do it. Why not give a sensible as well as scientific bill of fare that people will be inclined to try.”

In such wise spoke one of my companions who watched with interest my experiment of living on 3d. a day.

“ What more do you want than enough ? ” I enquired.

“ Well, introduce a ‘ two-eyed steak ’ some meat, a little more variety.”

It seemed a good idea, After all it is no use setting a pace which only the few can follow.

We need not make the term threepence a day into a fetish. Most persons can afford more. The Vegetarian Society of Manchester publishes a penny book called “ Life on Fourpence a Day,” with some useful statements in regard to the science of food, and fifty easy recipes for a family of five persons.

If we have 4d. a day we can introduce some few luxuries, not only to increase the protein and energy values but to give a more appetising fare.

The following alterations might be made in the provisions which I had when I lived on 1/8 a week.

1. To have $2\frac{1}{2}$ lbs. potatoes for $1\frac{1}{2}$ d.

2. To buy oatmeal or rolled oats at $1\frac{1}{2}$ d. lb. instead of 2d.

3. To get separated milk instead of new milk.

That would give us about 6d. to lay out in comforts and luxuries. But only such foods should be chosen as yield a good supply of protein and energy, e.g. :—

Bones for making soup ...	...	...	...	...	1d.
A pair of kippers or herrings ...	...	...	...	...	1d.
$\frac{1}{2}$ lb. brawn ...	...	...	...	...	2d.
$\frac{1}{4}$ lb. cheese ...	...	...	...	...	$1\frac{3}{4}$ d.
An extra $\frac{1}{2}$ lb. oatmeal...	...	...	...	...	$\frac{3}{4}$ d.

But with this surplus to “play with” for comforts one can pick and choose in various directions.

For more than a week I tried living somewhat on this plan, and during the first seven days my food consisted of—

	s.	d.
4 loaves of bread ...	0	9
1 lb. fat for dripping ...	0	3
Brawn— $\frac{1}{8}$ lb. at 4d. lb. ...	0	$0\frac{1}{2}$
Bones ...	0	$1\frac{1}{2}$
Rolled oats—1 lb. ...	0	$1\frac{1}{2}$
Haricot beans—1 lb. ...	0	2
Split Peas—1 lb. ...	0	$1\frac{1}{2}$
Rice—1 lb. ...	0	2
Sugar— $\frac{1}{2}$ lb. ...	0	$1\frac{1}{4}$
Apples— $1\frac{1}{2}$ lbs. ...	0	$1\frac{1}{2}$
Margarine $\frac{1}{4}$ lb. ...	0	$1\frac{1}{4}$
Tea $\frac{1}{3}$ oz. ...	0	$0\frac{1}{2}$
Sundries—pot herbs, pepper, and salt ...	0	1
	2	$2\frac{1}{2}$

This served me rather better than the food I bought the week recorded in an earlier chapter. I lost no weight and I was fully fed all the time. I enjoyed the meals thoroughly. The soup made from the bones was a great success and was very pleasant both separate

and with beans and peas. Pease pudding was a new dish to me and excellent in flavour.

I had no milk. I did not miss it.

There were few shops that sold bread at $2\frac{1}{4}$ d. the loaf, or sugar at $2\frac{1}{4}$ d. a lb. but they were to be found.

Potatoes were to be had at 5 lbs. for 2d., but I did not wish for them—even at that price they are not as cheap as the other articles I bought.

I tried brawn : it was quite good, but peas and beans suited me better. I had no wish for herrings or I would have bought them. I got very good apples at 1d. a lb.

Feeding is a matter for the individual taste. I began with the desire to use such a diet as would suit other people. I ended by eating what I wished for and what pleased me best, always holding science by the hand and buying the foods which experts have found to be the most nutritious and cheapest.

Cheese I had quite intended to adopt as an article of diet but found my meals excellent and sufficiently varied. I forgot to ask for my favourite Welsh-rarebit, or for macaroni.

I did not continue the experiment because it is rather difficult in a household to provide a separate diet for one person apart from other members of the family and keep account of the food used.

But these experiments have caused me to modify considerably my former system of diet with excellent results, and I should be quite prepared to undertake a more prolonged course of such food were any good purpose to be served by it.

So far I am fully convinced that on threepence a day for a time, or on fourpence a day for a lengthened period, one could live quite well and comfortably.

CHAPTER XXVII.

ARE YOU GETTING YOUR MONEYSWORTH?

I TRUST that those who have accompanied me thus far will feel that whatever the shortcomings of this little book they have had their moneysworth.

But a more serious question than that remains for those with small incomes to answer, viz., whether they are getting their moneysworth for the amount they spend on food.

It is an important question, especially where there is a young family to bring up, for food has to be provided on 365 days in a year. So that if only twopence a day can be saved and better food provided into the bargain it is worth a great effort.

For it is well to bear in mind that though solitary two-pences are not of very great account a year's two-pences amount to pounds sterling, and the accumulated two-pences of years thriftily laid aside and carefully invested means a pension for old age four times as large as the Government provides. There can, alas! be no doubt that a great deal of waste goes on in the very families that can least afford it, and this is the more tragic because of the self-sacrifice often displayed by the women and the cruel sufferings of the children.

The point I want very strongly to bring forward is that if families who are regarded as being "below the poverty line" only knew the comparative value of foods and selected those which are the cheapest and

best, a large proportion of them need not suffer from lack of nutrition at all.

Look for a moment at the daily fare given in working class homes in the chapter on Family Budgets. In the first porridge is twice used in the week but peas, beans or lentils—not at all.

In the second tea is used 19 times in the course of 21 meals; meat 13 times; peas, beans, lentils, and porridge—never.

Yet the first item on a menu of King George's breakfast table which I happened to see lately was porridge one of the cheapest, pleasantest, and most nutritious of foods.

IGNORANCE OF FOOD VALUES.

The report which has recently been published by the Government, prepared by Sir George Newman, Chief Medical Officer of the Board of Education, emphasises the absolute necessity of the mass of the people understanding something of the comparative values of food if we are to have a healthy and vigorous nation in the future.

It is stated in this report that 63 per cent. or nearly two-thirds of the 6,000,000 school-children in England and Wales are affected by some sort of disease, and that a considerable percentage of them suffer from a "greater or less degree of malnutrition," that is, that they have insufficient food.

Why in this vastly rich country are many of our Empire-builders of the future being half-starved?

"The Times" in an article on the subject, suggests an explanation:—

"No social problem," it says, "can press more urgently for solution than that of discovering how this state of semi-starvation has arisen, and how it may most effectively be remedied. The report leads to the conclusion that it is too widely diffused to be attributed to poverty in more than a small proportion of the cases; and a more probable explanation seems to be afforded

by the extraordinary ignorance of the English women of the industrial classes concerning food-values, cookery, and the general economy of dietetics. There is probably much truth in the assertion that the waste in an ordinary English household would maintain an ordinary French one of the same class."

The difficulty in dealing with the adults of to-day is shown in a letter I received from one of the leading caterers. He writes: "I have always experienced great difficulty to get customers to take what I felt was good for them, and have given up trying, and as a public caterer only supply what they want."

Just so, and what they want is education in the general economy of dietetics. We are all agreed this education must be given to the children more fully in the future than hitherto, for notwithstanding the great advance that has been made in the Domestic Economy Courses provided by Education Committees of late years, much still remains to be done. With the grown-ups we must do the best we can in other ways.

WHO IS RESPONSIBLE ?

It is difficult to fix responsibility for this serious state of things, and yet the Government can be hardly acquitted of blame. It issues books and pamphlets on social schemes, on wages and employment, and a variety of subjects literally by the thousand, but on the subject of how to make the most of the money which the people earn with so much toil and how to spend it to the best advantage in purchasing the primary necessities of life it is practically silent. An occasional book comes out when public opinion is violently agitated, but the Government takes little initiative in a matter of such supreme importance.

Contrast with this the steps taken by the Government of the United States, which has a special Office for Experiments in Nutrition under experts, whose sole duty it is to concern themselves with the food of the people. This Office has issued millions of copies of

valuable booklets on the subject. These are sent to the Educational authorities in every State of the Union, and through these channels the knowledge is communicated to the people at large.

Dr. Hamill's Report, to which reference is made in a previous chapter, bears ample testimony to the value of the work thus performed by the United States Government.

Is it too much to hope that some day, not far distant, our own Government will imitate such an excellent example and provide an Office and special staff for the investigation of Food Values? If so, it may be hoped that this Office will issue information to Schools, Colleges, Working-men's Clubs, Free Libraries and other Institutions which will thus permeate all classes and so influence the character, the health, and the well-being of the people.

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